FOOD INDUSTRIES

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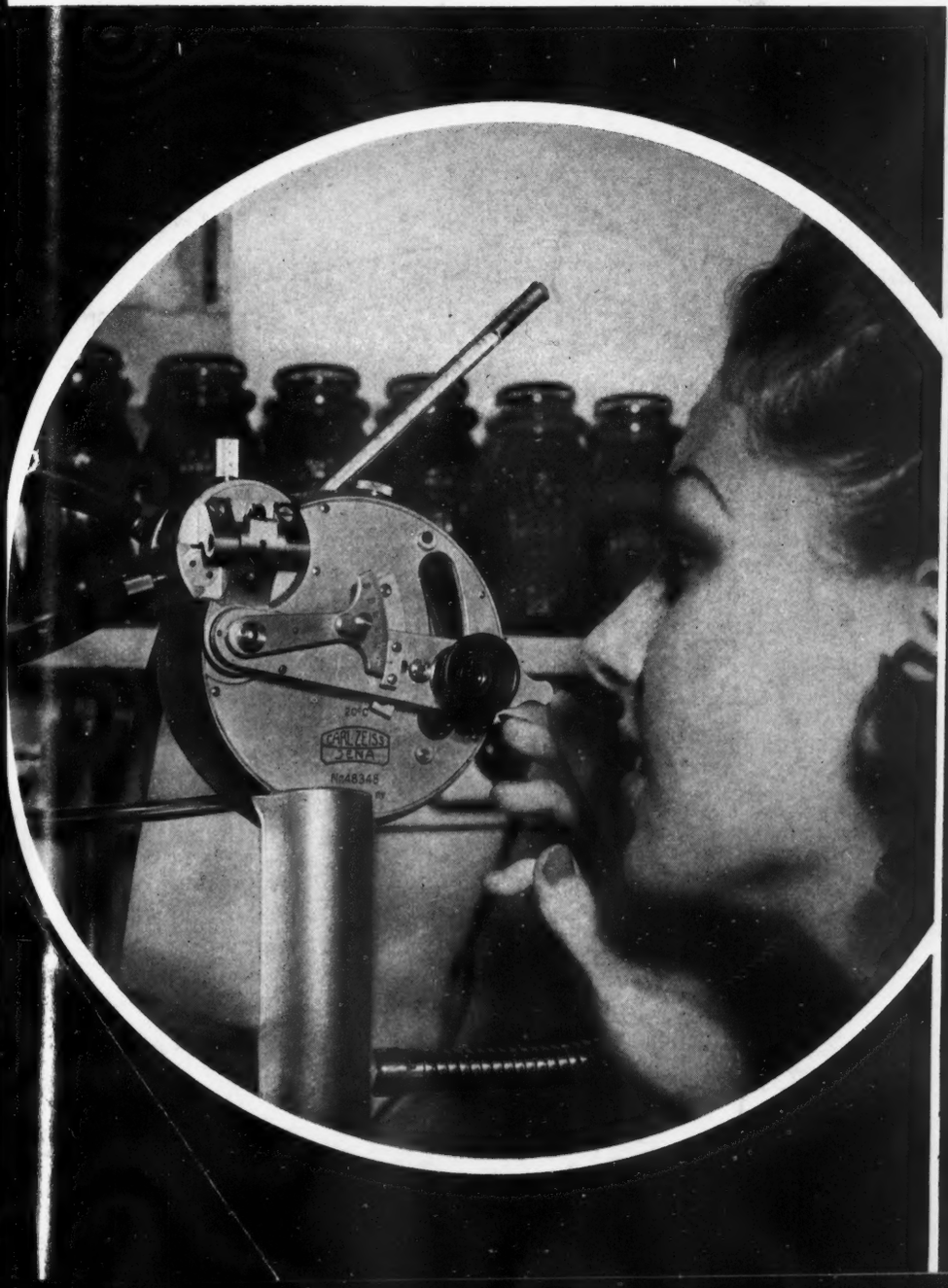
MAY - 5 1943
DETROIT

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



MAY 1943

WARTIME FOOD PRESERVATION

Dehydration Goes Multistage

Preserving Fruits In SO_2 Solution

Concentrating Citrus Juices

Brine Preservation Of Vegetables

Freezing Eggs For Home Use

Gas Storage Helps Keep Fruits Fresh

McGRAW-HILL PUBLICATION

YOU'RE LOOKING AT 3 WINNERS!

1. HERE ARE THE TWO WINNERS in the 1942 All-America Package Competition—and behind the sparkling printing of these Spud and Fleetwood folding cartons, is another winner. It is *Coated* Lithwite, the exciting new paperboard development announced to the world a little over two years ago.

2. WHAT'S SO EXCITING about it? *Coated* Lithwite is made by a new and patented process on one machine, in one continuous operation—and at high speed. This means more than a production economy . . .

3. FINER PRINTING on a finer surface. The secret mineral coating is applied with such velvety smoothness, that inks lay more evenly—come up with greater brilliance on this finer, whiter paperboard. And that's not all.

4. COATED LITHWITE folds and scores without shattering. Seals more positively in high-speed automatic machines. Point for point, *Coated* Lithwite adds up to an unusual paperboard. A prize-winner in its field!

RIGHT NOW, UNCLE SAM is our No. 1 customer. His needs get priority in our plants. But if you would like to examine printed samples of *Coated* Lithwite for consideration when times are normal again, we will be happy to forward them to you.

The GARDNER-RICHARDSON Co.

Manufacturers of Folding Cartons and Boxboard

MIDDLETOWN, OHIO

Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT

The war invention 500 years old

Have you heard about our tanks firing "tin cans" at the enemy?

It's an old trick, invented long before Columbus discovered America. The can, filled with deadly steel balls, is fired from a standard 37-mm. tank gun.

And here's what happens: The can (called "Canister") bursts in mid air after traveling maybe 30 yards. It scatters steel slugs in all directions. Masses of enemy ground troops are put out of action by a *single shot!*

How many millions of metal containers are going to war like this? The number is secret. But you know it must be huge, because you can't get beer cans, coffee cans and certain others for civilian use.

The can, America's favorite container, is racing off production lines to be filled with food, oil and other essential supplies.

It will be knocked around. Dropped from planes to beleaguered forces. Exposed to heat, light, dirt . . . and who knows what else? But no matter. It will get there—*safe.*

And when the can comes marching home, it will be better for the experience our laboratories and factories have gained as wartime "Packaging Headquarters for America."

ARE YOU MAKING WAR PRODUCTS?

Metal containers are delivering the goods *safely*—foods, supplies, and bullets arrive ready for action. Continental is making millions of these cans along with other war needs, including plane parts.

Yet, rushed as we are, we can still take on more! Right now, a part of our vast metal-working facilities for forming, stamping, machining and assembly is still available. Write or phone our War Products Council, 100 East 42nd Street, New York.

CONTINENTAL CAN COMPANY

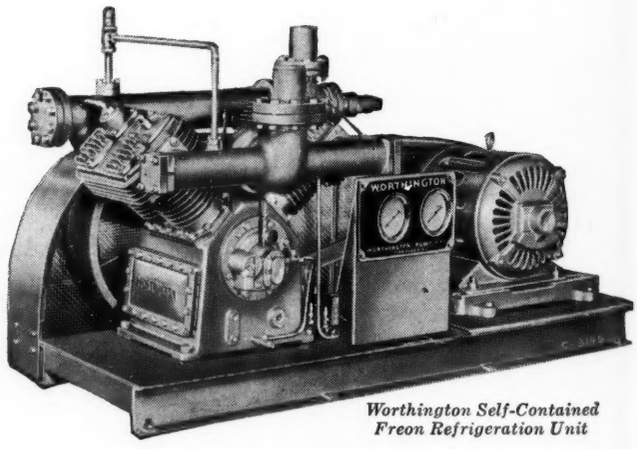
TO HELP CAN THE AXIS—BUY WAR BONDS

WE'RE GOING TO STRAIGHTEN THINGS OUT— BY AIR CONDITIONING THAT PART OF OUR PROCESSING— AT THE EARLIEST WE CAN!

IF I WERE YOU, I'D PUT IN A CALL TO WORTHINGTON AND GET SOMEBODY OVER HERE—AND START MAKING PLANS

Soundly Engineered in Every Size

Small units and large, complete with all accessories



Worthington Self-Contained Freon Refrigeration Unit

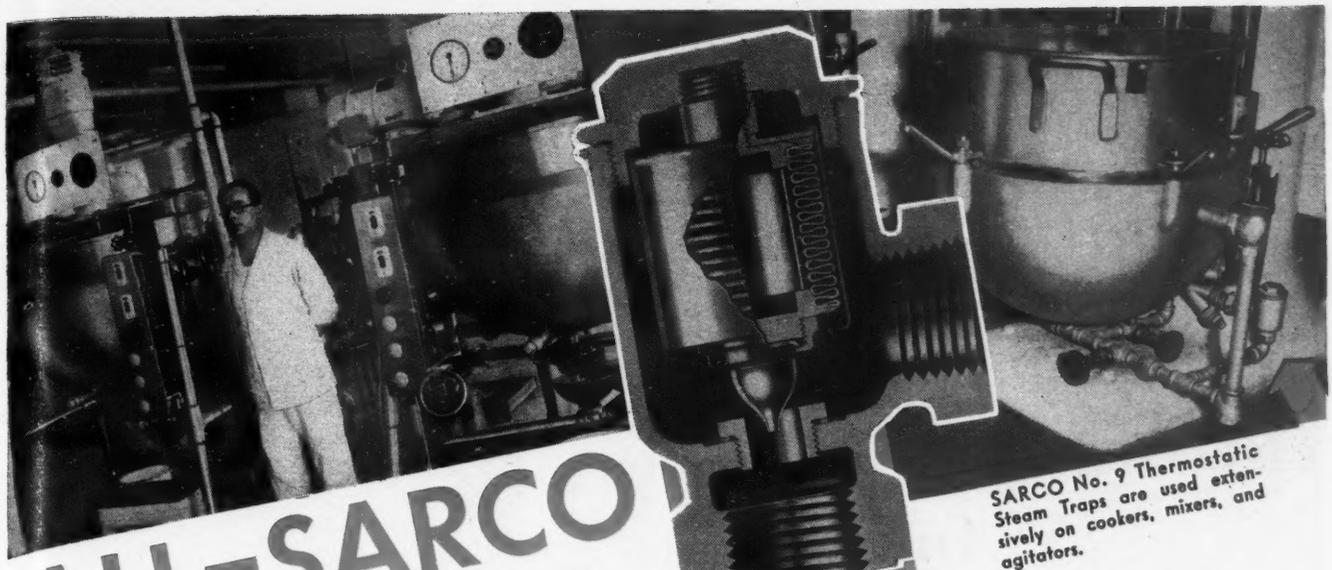
The food plant engineer will be the first to recognize in Worthington Refrigeration and Air Conditioning Equipment designs, the same engineering thoroughness which has made the name, Worthington, one which comes first to mind when pumps are mentioned. Compressors and auxiliary equipment are standardized in a range of sizes from which all requirements can be met. Our engineers are ready to collaborate with you in planning for a specific operating condition. Write us: Worthington Pump and Machinery Corporation, Harrison, New Jersey . . . Offices and Representatives also in Principal Cities.

CA 3-43

WORTHINGTON

Refrigeration

AND AIR CONDITIONING



SARCO No. 9 Thermostatic Steam Traps are used extensively on cookers, mixers, and agitators.

ALL-SARCO Chemical and Food Plants

Men and women in all-white uniforms, chrome-nickel equipment everywhere, and dozens of cookers, mixers and agitators, all equipped with Sarco No. 9 Thermostatic Steam Traps make this New York plant an outstanding example of streamlined efficiency.

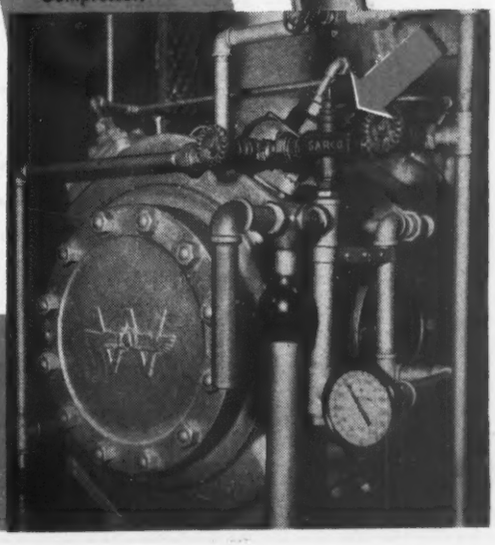
The Sarco No. 9 is noted for its ability to extract all the usable heat before its wide ports open to release the condensate. It is small, low cost, works at all pressures, and is ideal for use on each coil of batteries of steam equipment in the food, process and chemical industries. Ask for Catalog No. 250.

WATER COST CUT IN HALF

Checked by meter at this plant, the cooling water used on three compressors (one shown at right) was reduced 75,000 cubic feet per year, by using the Sarco TR-40 cooling control. Another TR-40 is used on the after-cooler. Test charts show that the compressor operates at top efficiency and the temperature of the delivered air is always the same. These and a half dozen other heating and cooling controls are described in the Sarco Catalogs 700 and 800.

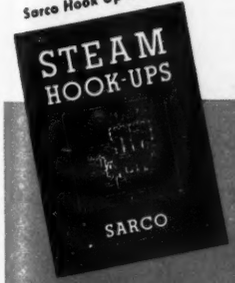
No. 9

TR 40



Sarco TR-40 Cooling Control on Compressor.

Ask for the New Enlarged Sarco Hook Up Book.



SARCO Saves Steam

SARCO COMPANY, INC., 475 FIFTH AVE., NEW YORK

Represented in Principal Cities

SARCO CANADA, LTD., 85 Richmond Street, West, TORONTO, ONTARIO

planning to buy **DEHYDRATION EQUIPMENT** ?

• • • THEN LOOK IN NEXT MONTH'S ISSUE OF THIS PAPER FOR

An

Important Announcement

REGARDING

The FLEET LINE DEHYDRATOR

It's new! *It's different!* *It's surprisingly better!*

IF YOU'RE IN A HURRY—

—don't wait for our June announcement. Write NOW and we'll send you advance information.

—Years of experience in making drying equipment plus a careful survey of the special requirements of the food industry are responsible for the Fleet Line Dehydrator.

RIGGS & LOMBARD

Incorporated

Foot of Suffolk St. Lowell, Mass.

OF DEHYDRATION EQUIPMENT

NEED MOTORS OR GENERATORS?

IF you need motors or generators, write or wire us . . . or consult your nearest Crocker-Wheeler office. We can make immediate deliveries on some types . . . but regardless of type, we can deliver in faster time than ever before.

New and vastly increased productive facilities, plus expert Joshua Hendy planning are the reasons. Crocker-Wheeler Electric Mfg. Co., Ampere, N. J. Division of JOSHUA HENDY IRON WORKS

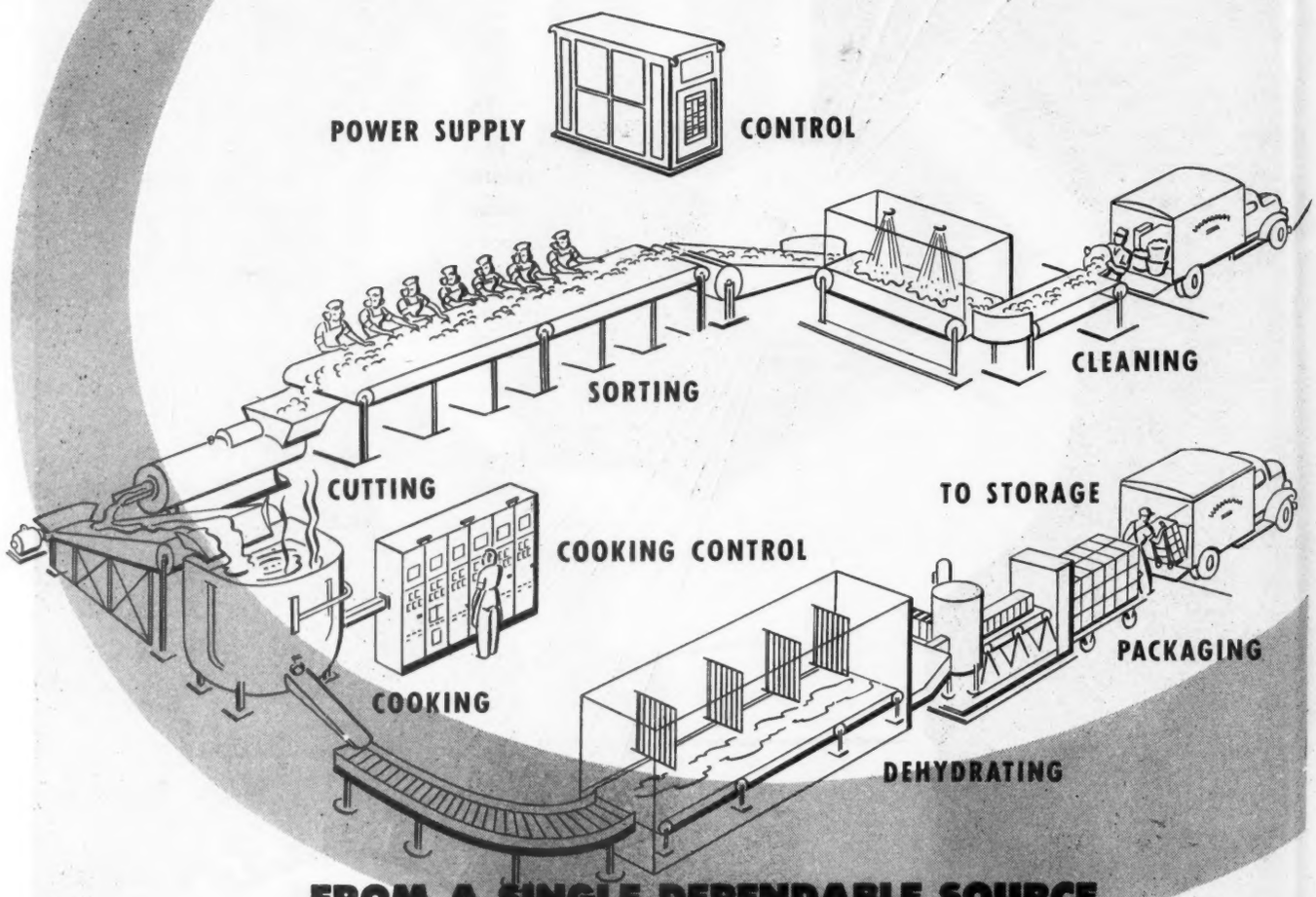
CROCKER-WHEELER

TRADE MARK REG. U. S. PAT. OFF.

Be SURE . . . with
CROCKER-WHEELER

Other JOSHUA HENDY IRON WORKS factories at Sunnyvale, Pomona and Torrance, California and St. Louis, Mo.

Westinghouse is headquarters for



FROM A SINGLE DEPENDABLE SOURCE

MOTOR DRIVES
- Splash-proof motors
- Gearmotors
- Pump drives
- Blower drives
- Conveyor drives
- Cutter drives
- Grinder drives
- Dehydrator drives
- Packaging machine drives

CONTROLS
- Motor starters
- Circuit breakers
- Water or dust-tight enclosures
- Control centers

ELECTRICAL SYSTEMS
- Distributor apparatus
- Unit substations
- Transformers
- Capacitors

STEAM EQUIPMENT
- Stokers
- Ash evacuators
- Steam jet vacuum pumps
- Mechanical drive turbines

LIGHTING
- Outdoor
- Interior
- Fluorescent

STERILAMP

PRECIPITRON

ELECTRONIC CONTROLS, SORTERS, COUNTERS

FOOD DEHYDRATION EQUIPMENT

BOTH ELECTRICAL AND STEAM

Westinghouse application engineers can offer you unbiased advice as to the use of steam or electrical equipment for your food dehydration plant. Standard Westinghouse power units are available for every drive in your dehydration process—whether it is for pumps, blowers, conveyors, cutters and grinders, dehydrators or packaging machinery.

And undivided responsibility is represented in the ability of Westinghouse to engineer a complete plant, from stokers and ash evacuators, mechanical drive turbines, to complete distribution systems, unit substations, transformers, circuit breakers and control centers.

Nor does Westinghouse service to the food industry stop there. Included in the list of products ideally suited for application in dehydration plants and other food processing operations is a complete line of lighting equipment, and such specialized items as Precipitrons for dust control, Sterilamps for bacteria-growth control, and electronic controls for sorting, counting and other operations.

Information on all of these products, plus the experience of Westinghouse application engineers, gained in years of consulting experience with industry, is available to you at no charge. Phone or write your nearest Westinghouse representative for this valuable assistance in planning the electric and steam requirements of your plant. J-94557

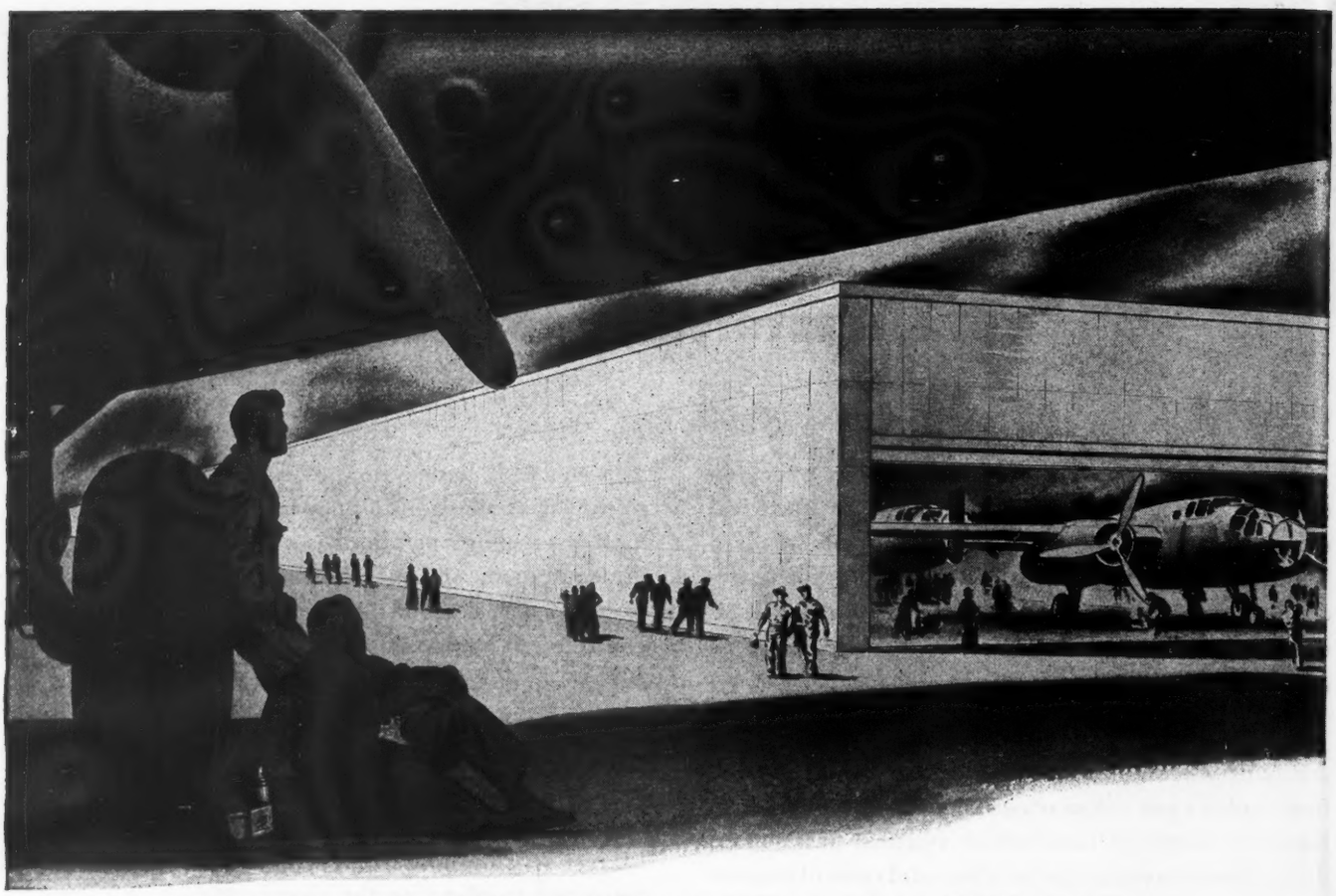
Get this binder of detailed facts on the types of Westinghouse equipment offered for application in dehydration and other food processing plants. Write today—Application Data and Training Section, Dept. F-1, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

TIME SAVER FOR THE FOOD INDUSTRY

Looking ahead with Asbestos



"BOY, NOTHING HERE BUT A VACANT LOT 98 DAYS AGO!"

"Yes, sir," says Joe Wingworker, "Three months ago she was just a vacant lot, full of weeds and old tin cans. And now look at her! That asbestos lumber made a plane plant spring up mighty quick. And they tell me the stuff won't rot or rust or ever need paint."

Righto, Joe! That "Stuff" is Keasbey & Mattison's "Century" Apac Board, and if you have anything to do with construction or maintenance after this war, you'd better make a note of it. Why, it's not only maintenance-free, it actually gets tougher with age and it's fire-resistant and weather-resistant.

Also remember, Joe, that Apac is an all purpose board . . . it is designed for roofing or siding and for interior walls, ceilings and partitions. No wonder more than 50,000,000 square feet have been used in essential war construction to date. "Century" Apac Board goes up fast . . . is trouble-free thereafter.

Total war has shown manufacturers in all fields how to produce faster and better. This, coupled with the fact that wartime building needs have lessened considerably, means that this material is now available again for widespread use.

If industry has its way, this new production efficiency will be kept at work after the war, making all the things a peacetime world will want and need—new things resulting from vision and research today.

* * *

Nature made asbestos;
Keasbey & Mattison, America's asbestos pioneer, has made it serve mankind . . . since 1873

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA

Makers of

asbestos-cement shingles and wallboards; asbestos and magnesia insulations for pipes, boilers, furnaces; asbestos textiles; asbestos electrical materials; asbestos paper and millboard; asbestos marine insulations; asbestos acoustical material; asbestos packings; asbestos corrugated sheathing and flat lumbers; asbestos-cement pipe for water mains

K&M best in asbestos

STURDY, HEAVY-DUTY PAPER BAGS

may solve your container problem . . .

More than *forty million* 100 lb. Multiwall Paper Bags were used for sugar in the first nine months of last year. If you ship in units of 25 to 100 lbs., you are invited to take advantage of the knowledge St. Regis has accumulated through years of intimate association with the food industry. A *specialized service* organization, St. Regis has the widest experience in the design and manufacture of Multiwall Paper Bags and paper bag filling and closing equipment . . . and *in their* use.

Some idea of the wide range of products packed in Multiwall Bags can be gathered from the following: chemicals, cement, lime, sugar, flour, pigments, beans and peas, fertilizers, coffee, etc. . . . in all, more than 300 products are being packed successfully.

Multiwall Bags give 100% protection because several sheets of tough kraft paper, supplemented by special laminated sheets where necessary, are placed together to make rugged, moisture-resistant containers. Your product reaches the customer in the same fine condition you packed it.

Immediate deliveries of Multiwall Paper Bags can be made . . . *custom-built* to meet your specific requirements. Your inquiry will receive prompt, expert attention.

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS PAPER COMPANY

TAGGART CORPORATION • THE VALVE BAG COMPANY

NEW YORK: 230 Park Avenue

CHICAGO: 230 No. Michigan Avenue

Offices also at:
Baltimore, Md. · Birmingham, Ala. · Dallas, Tex. · Denver, Colo. · Franklin, Va. · Los Angeles, Calif. · Nazareth, Pa. · New Orleans, La. · San Francisco, Calif. · Seattle, Wash. · Toledo, Ohio

War production requirements have given great stimulus to improvements in machine design.

This trend not only affects fighting equipment, but also every kind of industrial machine.

It will become even more pronounced during the reconstruction period following Victory.

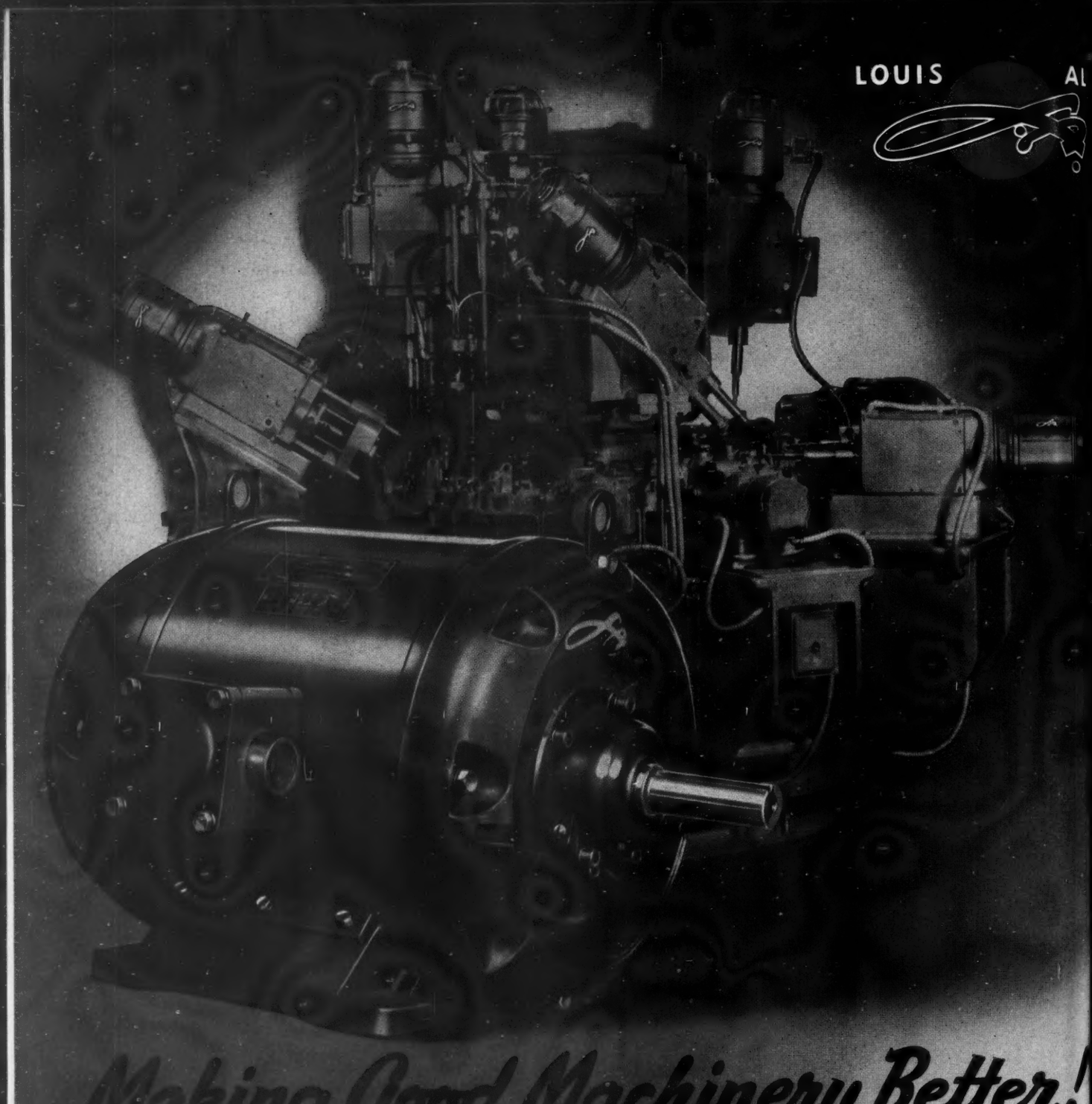
That's why it will pay you—*right now*—to redesign your product to include Timken Bearings at every possible point.

By doing so you will help the war effort; and furthermore you will be all prepared for the competitive post-war period with a better *performing* and a better *selling* product. "Timken Bearing Equipped" assures superiority to equipment buyers everywhere.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *TAPERED ROLLER* BEARINGS

★ ★ ★
IN WAR OR PEACE
YOU CAN DEPEND ON
THE LOUIS ALLIS CO.
As never before in History···
The American Red Cross urgently needs
Your Moral Help··Your Money··Your Time··
and Your Blood··not the other fellow's··YOURS!
THE LOUIS ALLIS CO., MILWAUKEE, WIS.



Making Good Machinery Better!

For over 40 years we have been developing special motors for special jobs — working with the designing engineers of many of the nation's leading machinery manufacturers — helping make good machinery better.

No matter what your electric motor problem or requirement may be, we invite your inquiry — and assure you that your needs will receive our prompt and careful attention in every way.

The motor illustrated is our TOTALLY ENCLOSED FAN COOLED Dust Proof motor — which is available in a wide range of electrical and mechanical modifications.

THE LOUIS ALLIS CO., MILWAUKEE, WISCONSIN

With a Bryant Dehumidifier *inside* for final-stage dehydration, you can forget *outside* humidity

More than ten million pounds of raw food must be dehydrated this year, according to the WPB and the U. S. Army Quartermaster Corps. This means speeding up all along the line. Among other things, it means that delays so often caused in final-stage vegetable drying by outdoor humidity must be overcome. And marked improvement in finishing bin operations is made possible by adding the Bryant Dehumidifier to existing systems.

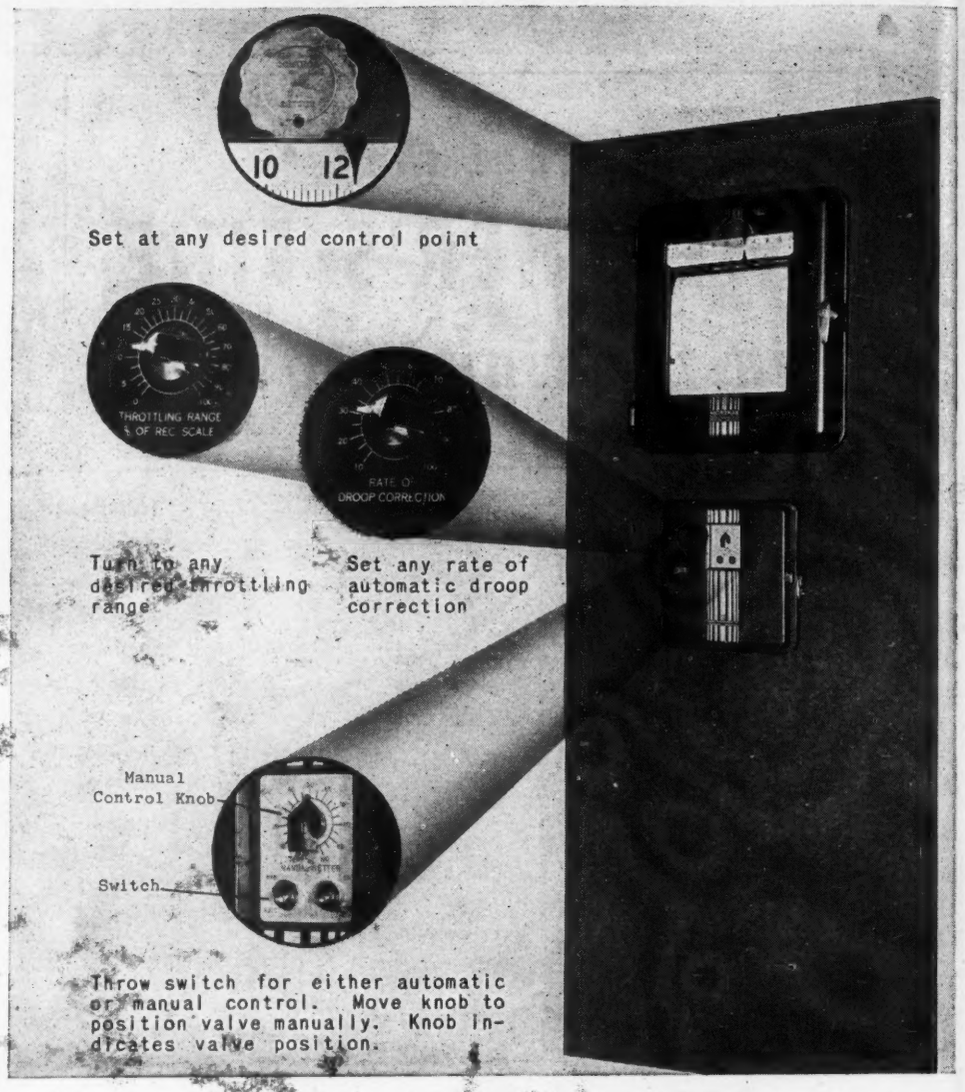
Because it supplies artificially-dried air, this equipment creates a moisture-hungry atmosphere in the finishing bin, regardless of outdoor humidity. It automatically reduces the humidity in delivered air as the drying process progresses. Bringing vegetables down to specified moisture content, therefore, becomes a surer and speedier procedure, unaffected by outside conditions, and without the dangers of structure breakdown and flavor loss often chanced through excessive heat application.

And the *finishing* bin is only the *starting* point of many efficient uses of the Bryant Dehumidifier in the dehydration plant. It can save time and reduce losses almost anywhere that foodstuffs must be dried and moisture regain prevented. *Ask your air conditioning engineer or engineering contractor to consider the application of the Bryant Dehumidifier.*

Bryant

DEHUMIDIFIERS

THE BRYANT HEATER COMPANY
17825 St. Clair Ave., Cleveland, Ohio


10 12
Set at any desired control point
THROTTLING RANGE
% OF REC. SCALE
RATE OF
DROOP CORRECTION
Turn to any desired throttling range
Set any rate of automatic droop correction
Manual Control Knob
Switch
Throw switch for either automatic or manual control. Move knob to position valve manually. Knob indicates valve position.

Micromax is easily tuned to the furnace's needs—all settings are made at the front of the panel.

TO DEFEAT TEMPERATURE SWINGS Make MICROMAX the Operator's Helper

Every setting and resetting of its temperature controller which any standard type fuel-fired furnace or oven could require is supplied with the Micromax Control equipment shown above.

We do not even have to know how much load-swing you anticipate, or how much lag; many users do send us such facts, but the Controller is completely adjustable to any such problem . . . the limits of satisfactory control, if there are limits, being determined by factors outside the Pyrometer.

Just tell us, when you specify Micromax, the make, size and type of valve; the fuel and air pressures; the type of thermocouple if you have preference; the range of temperature to be controlled; the amount of wire needed between couple, Micromax and valve; and whether you want to have the equipment mounted on panel as shown. The resulting installation will help you secure control of unsurpassed sensitivity, accuracy and dependability.

If a Catalog will answer your needs, ask for N-00A, Micromax Electric Control; our new, compact, fully-illustrated 30-page description of this equipment.

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA., PA.

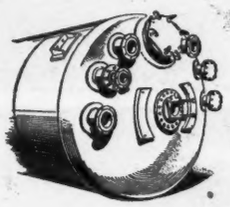
LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

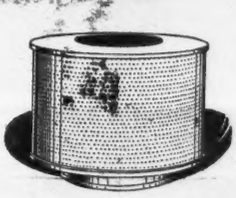
Jrl Ad N-33A(19)

STAINLESS STEELS for the Tough Jobs in Industry

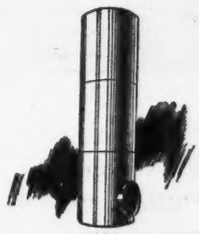
Typical applications of Stainless Steels selected for specified jobs . . . .



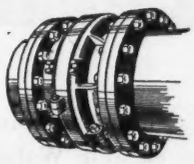
Autoclave used in the plastics and rayon industry is made of chromium-nickel-molybdenum stainless steel to combat the pitting corrosion of organic acids.



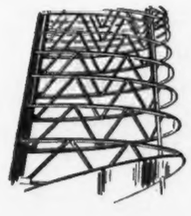
Wringer baskets are made of chromium-nickel steel to resist the corrosive action of mixed sulphuric and nitric acids in the manufacture of explosives.



Absorption tower, of high-chromium corrosion-resistant steel, reclaims nitric acid from waste NO_2 gases in the chemical industry.



Oil refinery expansion joints are built of 18-8 chromium-nickel steel to withstand corrosion under high pressures and temperatures.



Aircraft nose ribs of stainless steel will be covered with a skin of stainless steel for a light structure with high strength.

Centrifugal extractor in the pharmaceutical industry is made of 18-8 stainless steel for product purity and equipment durability.

"Electromet" is a registered trade-mark of Electro Metallurgical Company

STAINLESS steels do the tough jobs in industry. Their superior resistance to corrosion and oxidation, and their remarkable strength-weight ratio, make them valuable in many war-production applications.

A steel is classed as stainless when it contains at least 12 per cent chromium. Other alloying elements . . . such as nickel, manganese, columbium, silicon, molybdenum, titanium, and vanadium . . . may be added to vary the properties of the steel. This variation in properties makes it important that you select a steel for the job it has to do. By careful selection of the proper stainless steel for your job you can help conserve stainless steels and the metals used in making them.

• • •

Although we do not make steel, we have for 35 years produced Electromet ferro-alloys and metals used in steel-making. Our metallurgists have made an extensive study of alloy steels, both in the laboratory and in the field. If you have a problem in the selection, fabrication, or use of alloy steels, consult us.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York, N. Y.

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet
Trade-Mark
Ferro-Alloys & Metals

WALSEAL
...serves well because it "fits the service"
WALSEAL Fitting
Oxyacetylene Flame
The SIL-FOS BRAZING ALLOY flows over the entire clearance area, making a joint that is stronger than the pipe.
White ring of SIL-FOS appearing all around the pipe at this point is your visible evidence that the joint is made—and made right.

Vibration proof, corrosion resistant, and leakproof! Yes, a Silbraz Joint made with Walseal Flanges, Fittings, or Valves has the inherent stamina to withstand the incessant shaking, the moisture, the changing temperatures, and inevitable knocks of war-time service. Tens of thousands of Walseal products are proving beyond dispute that they truly make a "one-piece pipe line." A Silbraz Joint cannot creep or pull apart under any temperature to which brass or copper pipe can be safely subjected.

Today Walseal is "all out" for war. In the peace to come the use of Silbraz Joints for assembling non-ferrous piping will continue to expand. Walseal Flanges, Fittings, and Valves have the added advantage of being installed easily even in cramped quarters.

You'll find complete information on Walseal products in the new Walworth Catalog 42 on pages 230 to 242, inclusive.

• • •

If you want a copy of this up-to-date catalog of Walworth Valves, Fittings, Pipe, and Pipe Wrenches, write for it on your business letterhead. Address: Walworth Company, Dept. 52, 60 East 42nd St., New York, N. Y.

ARMY E ARMY E NAVY

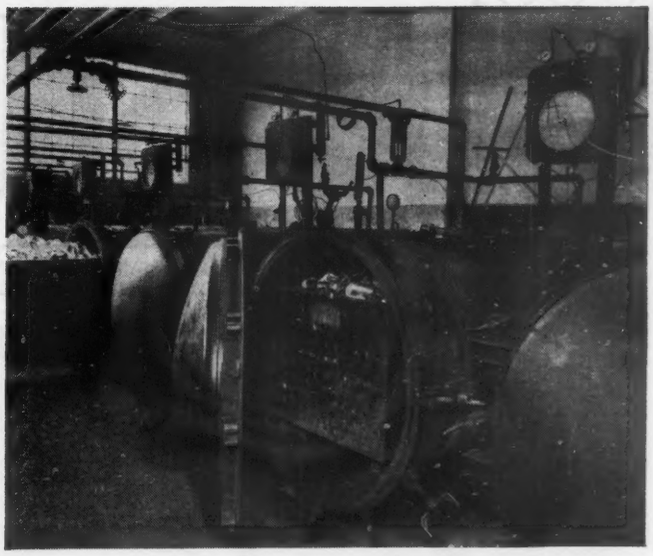
BOSTON WORKS
KEWANEE WORKS

WALWORTH
valves AND fittings

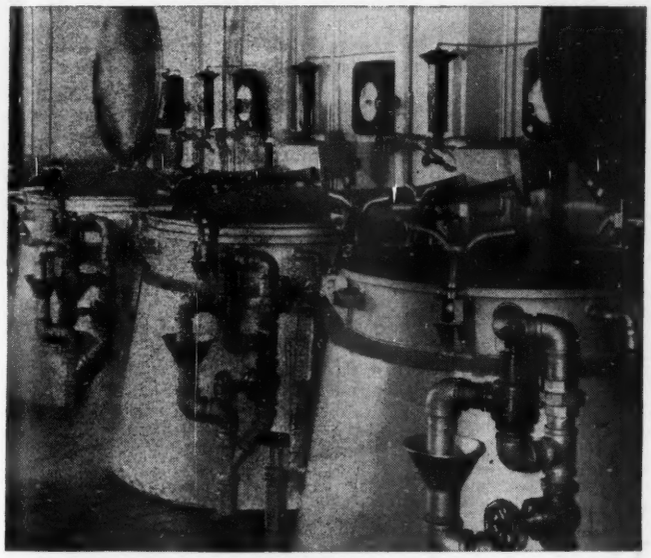
WALWORTH ★ VALVES AND FITTINGS ★ 100TH ANNIVERSARY

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

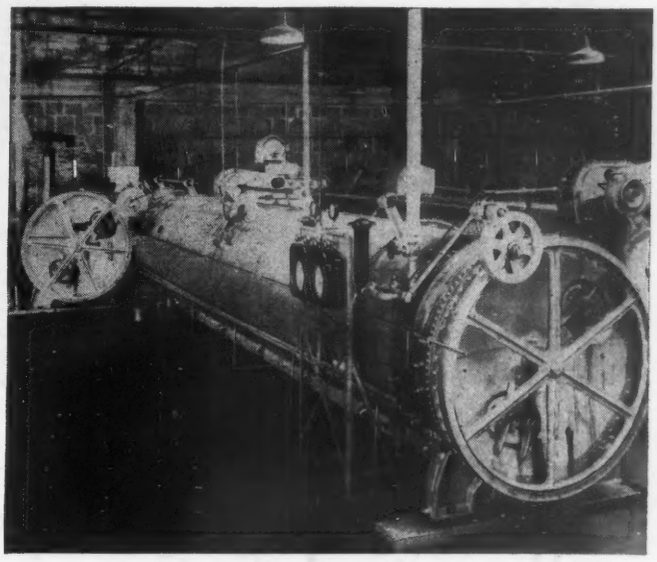
Where does "KNOW HOW" come from?



1 We've got nothing against luck. But we prefer experience—and that's where *our* "know-how" has come from in the application of Taylor Automatic Control to the processing of foods.



2 Maybe your problem calls for vertical retorting, as above. Or horizontal (as in Picture No. 1). In any case, there's a thoroughly worked-out, time-tested Taylor Control System that can be adapted to your exact requirements.



3 Glass is no new problem for us either — in fact we made our first glass installation as long as 20 years ago. The Taylor-equipped installation shown here is probably the world's largest continuous pressure cooker-cooler for glass package processing.

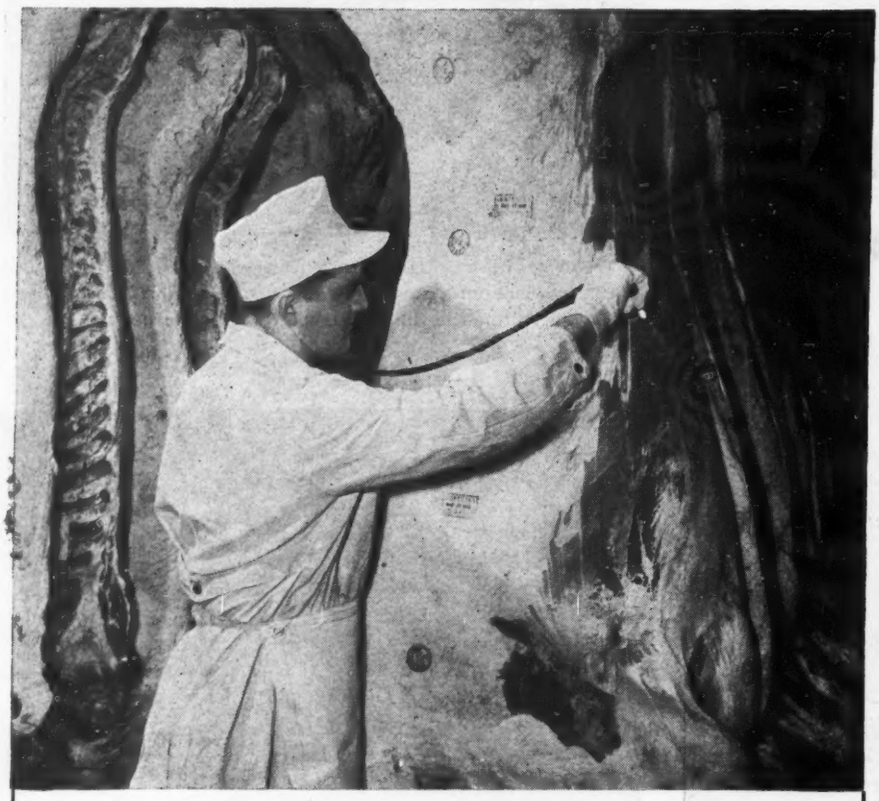
4 The quality and purity of a nationally known line of baby foods are protected by automatic Taylor Control of temperatures and pressure in the retorts shown above. With food and tin both scarce, accurate control is more important than ever! And "Taylor means Accuracy First!"

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

5 Whether your problem is tin, glass, or dehydration, see your Taylor Field Engineer! Phone your nearest Taylor office, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow, and liquid level.*

INSIDE NEWS

MAY PREPARED BY NATIONAL CAN CORPORATION, NEW YORK, N. Y. 1943



A "ribber" separating the forequarter of beef from the hindquarter in a packinghouse cooler.

Cold Storage Destroys Parasitic Infections in Meat

Some States Make Freezing a Regulation in the Preparation of Meat Products

Freezing at 5° below zero for 20 days destroys parasitic infections in meat which cannot be detected by ordinary inspection, according to a recent report to the American Chemical Society. Tularemia, or deer fly fever, in rabbit meat and trichinosis in pork can be controlled by freezing at proper temperatures. Thereafter the meat is kept in cold storage under controlled temperatures until it reaches the consumer.

In Massachusetts wild rabbits are free from the disease of tularemia and the Department of Conservation has a regulation quarantining imported live rabbits before they are liberated. Moreover, carcasses of rabbits shipped from other states into Massachusetts must have been kept in cold storage at a temperature of less than 30° F. for a period of not less than 30 days.

All trichinae is destroyed in pork if the product is frozen for 20 days at 5 degrees below zero. However, only the commercial meat packing houses have the equipment to safely perform this freezing operation. No system of inspection can guarantee pork to be free from this parasite. Every householder, to be safe and to develop the best flavor in fresh pork, should cook the meat until the red color has entirely disappeared. In human beings trichinosis is usually confined to those races who prefer to eat their pork under-cooked.

Among the regulations of the U. S. Bureau of Animal Industry, as well as those of the states of New York and New Jersey, governing the preparation of meat products, freezing is of paramount importance. In a sense, however, the state regulations are experimental in nature. If they prove to be of definite value as a public health safeguard, the freezing regulations will mark a big step toward ultimate control of trichinosis in this country. (357)

'Gross' vs. 'Net' Income

At last American business is beginning to think with its head! Witness the Johns-Manville Corp. Advertisements telling the public, its customers and employees what the company's balance sheet shows for the first full year of wartime operation.

Gross income $108,500,000. Salaries and wages $37,000,000. Taxes $16,500,000. Other costs of doing business $49,500,000. Rainy-day reserves $3,500,000. Dividends $2,000,000.

What a different picture that is from the one conjured up by the demagogue who only refers to "gross" income and ignores the "net"—the figure which tells the real story.

Johns-Manville had a large total (gross) income but the breakdown shows 34 per cent going into pay envelopes, 15 per cent to the tax collector, and only 2 per cent to the stockholders whose ventured capital made the business and the pay roll possible.

As other corporations see the wisdom of going to the public with this sort of proof that the profit has been taken out of war, distortion of the American business picture by demagogues, politicians and soap-boxers will become more of a chore. (338)

—Reprinted through courtesy of New York World-Telegram and Johns-Manville Corporation.

New Paste Scouring Agents

To replace steel wool and soap scouring pads, now banned from the market by war needs for steel, a new type of paste scouring soap packed in wide-mouth containers is being offered.

These scouring pastes are similar to ordinary mechanics' paste hand-soap except that they are firmer and carry a higher percentage of abrasive. The abrasive used is coarse powdered pumice, comprising 35 to 45 per cent of the paste, along with 25 to 30 per cent of soap and a small percentage of sodium silicate and glycerine substitute. The new pastes are designed to replace the steel wool pads in scouring pots and pans in homes and restaurants. (339)

Canned Mussel for Lend-Lease Shipment

The sea mussel seems destined to become popular here as the nation looks for more food resources, according to the Office of the Coordinator of Fisheries. Closely related to both the oyster and the clam, the mussel can be used and cooked in the same manner. Its flavor, which will be at its peak until June, is something like that of the longneck clam.

Maine, Massachusetts and Rhode Island have considerable resources of this excellent seafood and it is probable that a million bushels will be taken this year. Mussels have always been popular in Great Britain and one canning company here has been experimenting recently with canning them in the United States for possible lend-lease shipment to England. (340)

NATIONAL CAN

PLANTS: NEW YORK • BOSTON • BALTIMORE • CHICAGO • HAMILTON, OHIO • FORT WAYNE, INDIANA

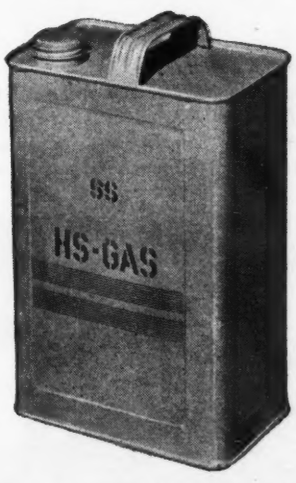
New Product for Organic Syntheses

Diphenyl sulfone was recently offered as a new product by a large American chemical manufacturer.

Characteristics of the compound are said to suggest its use as an intermediate in organic syntheses or in the preparation of diphenyl sulfides, selenides and their derivatives. It is slightly soluble in hot water and soluble in most of the usual organic solvents.

Laboratory quantities are available in a technical, grayish white powder with a melting point of 120-125° C.; and a pure grade consisting of white crystals and having a melting point of from 127-129° C. (341)

Looks Innocent Enough —But it Packs a Wallop!



The standard one-gallon can, so widely used in the paint and chemical industries, is now serving the United Nations on world battle-fronts as an important part of certain types of land mines. It is but one of many essential wartime containers being produced in quantity by National Can Corporation.

U. S. May Become a Leading Cheese Exporter

Prior to the war American cheeses were little known outside the United States, but at present they are going abroad in staggering quantities. In 1939 our exports of all types of cheese were less than 1,500,000 pounds. In 1943 274,000,000 pounds of American cheddar cheese alone is expected to be shipped to the Allied Nations.

American dairy farmers and packers have reason to believe that this global distribution will result in widespread acceptance of American cheeses after the war. (337)

Technical Topics

CAT-TAIL DOWN—Down from the common cat-tail makes a stuffing floss comparable to Kapok, formerly imported from Java. A pilot plant in Wisconsin is already using large quantities of cat-tails from nearby marginal farm swamp land. (342)

WEED KILLERS—The use of catalysts to increase the destructiveness of weed killers has been tested by an English railroad. Using a mixture of sodium chlorate and calcium chloride, various catalysts were added. In all cases the lethal effect of sodium chlorate was increased, vanadium pentoxide appearing to be the most powerful catalyst. (343)

BLACK COTTON, according to a Soviet embassy bulletin, is a new variety which eliminates the necessity of using black dyes to color the fibre. In this country considerable research has been devoted to the possibility of raising different shades of plants by chemical treatment of the soil or the sap of such plants. (344)

ALCOHOL from wood is a new American industry. Alcohol was once made in this country from the waste sulphite pulp of paper mills, but discontinued because of high cost. The new process produces ethyl alcohol at a lower cost than present methods which use grain. (345)

TUNG OIL SUBSTITUTE—A substitute for tung oil, with excellent properties as a drying oil, has been found in a tree growing wild in Mexico, which estimates indicate can give a yield of 1,200 tons a year. A fatty acid extracted from this oil has additional value for candle making. (346)

NEW INSECT INGREDIENT—There is renewed interest in sabadilla as a raw material for the manufacture of insecticides because of the acute shortage of pyrethrum, derris, cube, etc. A process for use of sabadilla has been worked out and will be offered commercially by the Alumni Research Foundation of a mid-western university. (347)

MANILLA FOR ROPE—Several hundred acres a week in Panama and Costa Rica are being cut from the jungle and seeded to Manila fibre plants as a step toward filling the United Nations' need for rope. (348)

SUBSTITUTE FOR CASAVA—Eastern Colorado farmers this spring can aid in the war by growing leoti sorghum as a substitute for Casava, starch-bearing plant of the Orient from which tapioca is made, or as an excellent feed for livestock. (349)

CHEMICALS INCREASE GUM FLOW OF PINES—The labor shortage and the urgent need for production of more rosin and turpentine for war uses focus attention on the discovery by the U. S. Forest Service that 40 per cent sulphuric acid solution or a 25 per cent solution of caustic soda (lye) will greatly increase the gum flow of both longleaf and slash pines. (350)

ABACAXI SACKS—Abacaxi fibre is being used in Brazil for production of sacks, according to a Brazilian publication. It is claimed that abacaxi is stronger than jute and has given excellent results in the manufacture of sacking material. (351)

BUTYRALDOXIME is being offered in semi-commercial quantities by an American manufacturer for practical plant development of its reactions. Suggested uses are as a solvent, antioxidant and in organic syntheses. Homologous oximes are also said to be available in sample quantities. (352)

HAY FEVER—Vitamin C has been suggested for the treatment of hay fever in a recent report of investigations carried out at a mid-western college. Noting the low levels of vitamin C during hay fever, sufferers were given vitamin C in an effort to bring the body content to normal. The experiments recorded a distinct gain with eighty-eight per cent of the patients. (353)

CHEMICAL SMOKE—Perchloroethylene is the basis of a chemical smoke screen developed by an American manufacturer. The fluid, once used extensively for dry cleaning, is converted into hexachloroethane which reacts vigorously with fine metallic zinc to form zinc chloride. During the reaction there is liberated a large quantity of heat which evaporates the zinc chloride and produces a dense cloud of white smoke. (354)

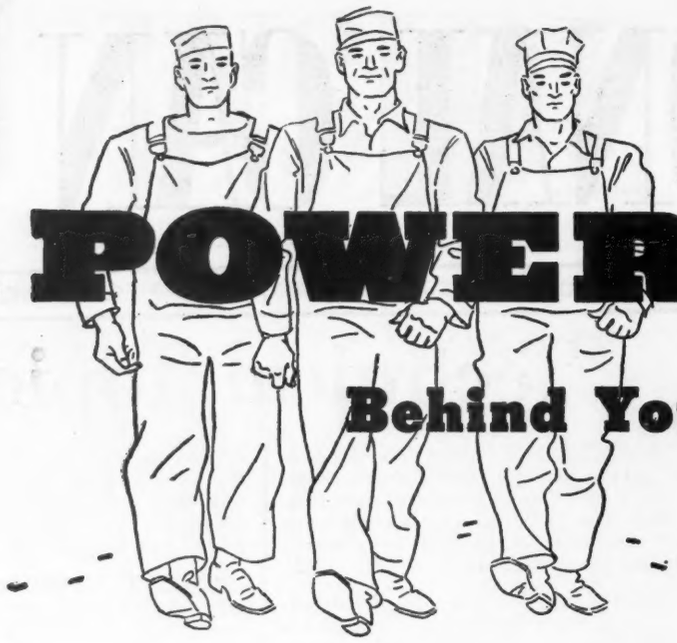
CHROMIUM FLUORIDE AND FORMALDEHYDE have been found in Russian investigations to preserve industrial wool textiles against bacterial degradation. Potassium bichromate and barium fluosilicate could be substituted for the chromium fluoride it was declared. (355)

REPLACEMENT FOR CHLORINE—Ethyl mecuric compounds have been found suitable as replacements for chlorine in the prevention of mold in ground wood pulp during storage, and for addition to pulp while in the beater to prevent formation of slime on the paper making machine. (356)

Every effort will be made to furnish additional information on these articles. Where such information is not obtainable, we will refer inquiries to the original source of the article. Write to National Can Corp., 110 E. 42nd Street, New York City. Please mention the number at end of article—also name of the magazine you saw it in.

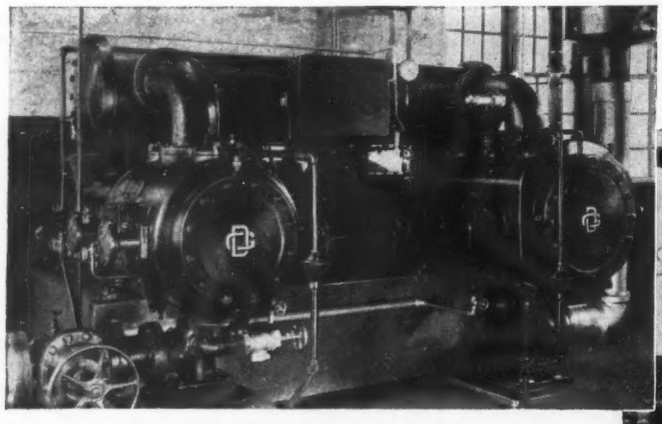
(Advertisement)

More POWER Behind Your Manpower!!

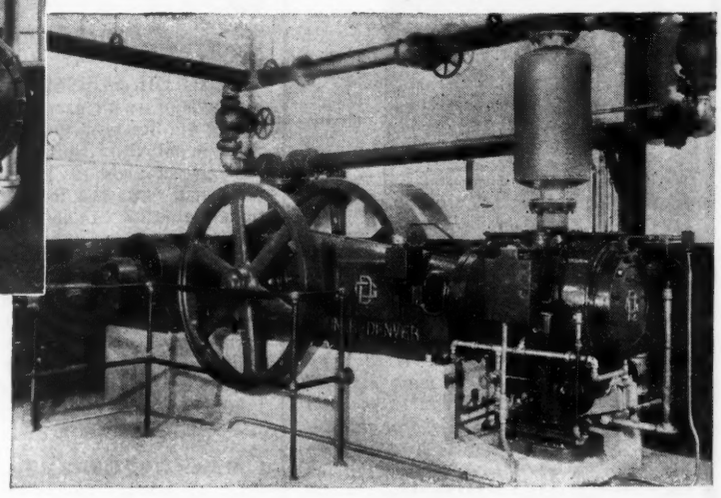


IN today's production battle, every man-hour counts for more when it's backed by plenty of power. Gardner-Denver Horizontal Compressors have long been famous as an ever-ready source of compressed air power. They're proving themselves under the grind of continuous operation in scores of war plants today—taking in stride the extra hours—the extra demands for air output.

Their dependable performance is based on such advanced design features as extra rugged frame construction . . . Timken roller main bearings . . . entirely automatic capacity control.



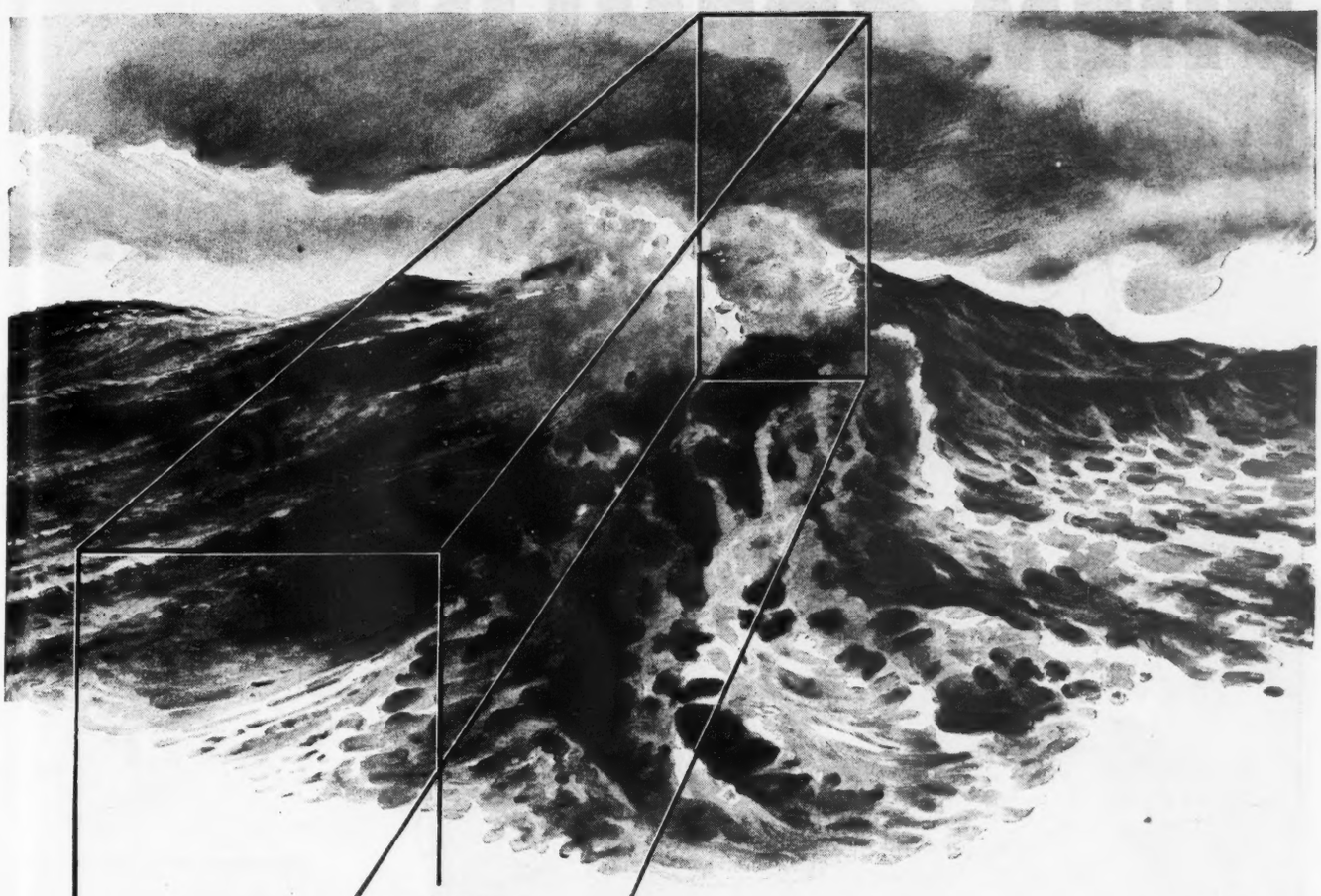
Designed for unusually low horsepower requirements—Gardner-Denver "RX" Single-Stage Horizontal Air Compressors are built in capacities from 89 to 1292 cubic feet displacement per minute.



Engineered for continuous heavy-duty performance—the Gardner-Denver "HA" Two-Stage Horizontal Air Compressor is built in capacities from 468 to 1854 cubic feet displacement per minute.

Write for bulletin giving complete information on Gardner-Denver "HA" Two-Stage and "RX" Single-Stage Horizontal Air Compressors. Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER *Since 1859*



THE BRICK THAT SAVED A THOUSAND SHIPS

Dehydrated food saves shipping space.
Compressed dehydrated food briquettes
Save still more space.
Thus, one supply ship can now carry
The food equivalent of ten supply ships . . .
And each ship can provision ten times
As many soldiers as ever before.
Air conditioning and refrigeration equipment
Makes possible these dehydrated food bricks . . .
Dependable and efficient cooling equipment
Provided by General Electric. After the war,
When air conditioning and refrigeration
Will again become available to the public,
Take advantage of G-E experience
In the fields of air conditioning and
Commercial and industrial refrigeration . . .
Turn to General Electric.
Air Conditioning and Commercial
Refrigeration Department, Division 435,
General Electric Co., Bloomfield, N. J.

Air Conditioning by **GENERAL ELECTRIC**

THEM GREMLINS

can't get at food or munitions packed in STEEL CONTAINERS

Bacteria
Fungus
Fumes and Odors
Vermin
Heat and Cold
Moisture
Dust and Dirt
Rough Handling

made by an old company with a NEW NAME—

Operating under the same management installed by the Inland Steel Company several years ago.

INLAND STEEL CONTAINER CO.

Formerly WILSON & BENNETT MANUFACTURING COMPANY

6532 S. MENARD AVE. CHICAGO, ILLINOIS

Plants at Chicago—Jersey City— New Orleans—Richmond, Calif.

Sales offices in all principal cities

CONTAINER SPECIALISTS

2000-LB. MESSAGE TO THE JAP FLEET—

The torpedo that fights the Jap must first win against the same enemy you fight in your work—*corrosion!*

That ton of torpedo, darting toward a Jap cruiser, carries the American message—"this is *one* installment in our reckoning with Tokyo!"

Straight and true, it holds its near mile-a-minute course—the Navy's "Joe Louis punch"—a one-ton mechanism more intricate and finely balanced than a costly watch.

1300-plus parts do their perfectly coordinated job behind the war head of this American "tin fish." They can hold it at a pre-determined depth for miles—get it back on course if it swerves or "porpoises"—dip it, if necessary, under a screening destroyer to find an aircraft carrier beyond—do everything, in fact, but think!

And this, despite the weeks or months on shipboard in varied climates, exposed to sea-buffeting, vibration, temperature change and corrosion.

Yes, a torpedo is a marvel of engineering. And backing up its precision design are parts chosen with matching precision to do their job perfectly.

Many of these parts . . . as you would expect . . . are made of MONEL. Tough, strong, rust proof . . . MONEL combines all the qualities of the ideal "sea-goin" metal . . . qualities also vitally important in the factory.

Today, MONEL serves vital needs on our war fronts as it does year-in and year-out in the world of foods.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST, NEW YORK, N.Y.

★ ★ **INCO NICKEL ALLOYS** ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL

Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings

He does MUCH MORE than MAKE them for the food industry

HE MANUFACTURES more than 2000 types and sizes of chain belts. That is, however, only a part of his business.

His business is mechanical engineering, the design . . . manufacture . . . application . . . selling and maintenance of special apparatus for transmitting power and handling materials.

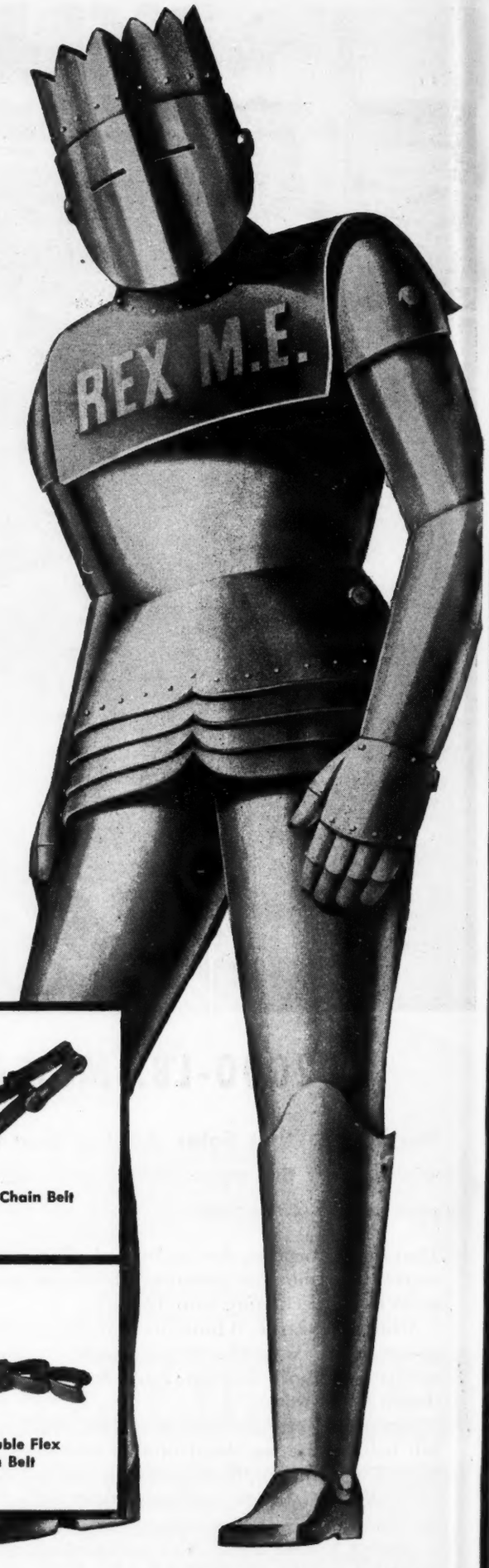
In order to design and manufacture his chain belts, Rex Mechanical Engineering—Rex M. E.—must perform the functions of application and selling. These are in some ways his most important obligations.

Because of the complexity of modern industry, all engineers must seek and get from each other the extensive and intensive knowledge that only specialization can provide.

Application and selling are the technical information services provided by specialists to help analyze difficulties and find the best ways for surmounting them.

For this service Rex Mechanical Engineering—Rex M. E. —maintains a field organization, most of whom have served their apprenticeships in his laboratories, drafting rooms and factories. For additional counsel, the territorial men call on specialized designing engineers in Milwaukee who have the advantages of national experience.

Through the work of all of these men in many fields, Rex M. E. is learning—and making available—much that is helpful to the machine designer and production engineers in the great work in which they are engaged, namely, to achieve a maximal result at minimal cost and waste.



REX

Rex Table Top Chain Belt

CHAIN BELTS

In more than 2000 sizes and types

Rex Pintle Chain Belt

Rex Roller Chain Belt

Rex Chain Belts which are made in malleable iron are also furnished in Rex Z-Metal, a superior material for cast chain belts. Many other chain belts are made of steel for the heaviest services or highest speeds. There is a Rex chain belt for every drive and conveyor. For further information, write Chain Belt Company, 1616 West Bruce St., Milwaukee, Wisconsin.

Rex Double Flex Chain Belt

CHAIN BELT COMPANY OF MILWAUKEE

HAVE YOU READ ABOUT 'EM?

made by the makers of Johnson's famous **WAX-FORTIFIED** *Paints*

For economical wartime maintenance in:

- *Dairies*
- *Machinery*
- *Processors*
- *Bakeries*
- *Offices*
- *Millers*
- *Confectioners*
- *Canners*

We took the best materials available. We blended them with the same precision and skill which go into all Johnson Products.

And now this new War-Formula Paint is ready . . . ready to help reduce paint maintenance problems and costs to a minimum! In it are retained as many as possible of the advantages of Johnson's Wax-Fortified Paints.

Send for the facts about Johnson's War-Formula Paints and Enamels . . . finishes which provide from 400 to 600 sq. ft. coverage per gallon, finishes whose drying time is uniform, finishes you can brush or spray on, quickly and easily. Mail the coupon today.

S. C. JOHNSON & SON, INC.

Industrial Maintenance Division, Dept. FI-53, Racine, Wisconsin

TO YOU OUR THANKS . . . AND A PROMISE

To so many of you, we owe our thanks for the reception you have given Johnson's Wax-Fortified Paints and Enamels in the last few years. Their rise in popularity has been remarkable by any standard.

Because some of the products used in Johnson's Wax-Fortified Paints are vitally needed by our government now, we have discontinued the line until after the war, rather than use substitute materials.

But this we promise. When we are able to produce Johnson's Wax-Fortified Paints again, they will be even better than before.

S. C. JOHNSON & SON, INC., Dept. F I-53
Industrial Maintenance Division, Racine, Wisconsin

Please send me a copy of your illustrated booklet, "Johnson's War-Formula Paints," giving complete information on and specifications for the use of Johnson's new War-Formula Paints and Enamels.

"Xtra! Xtra! Read all about it! Send coupon for your copy today!"

*Name*_____

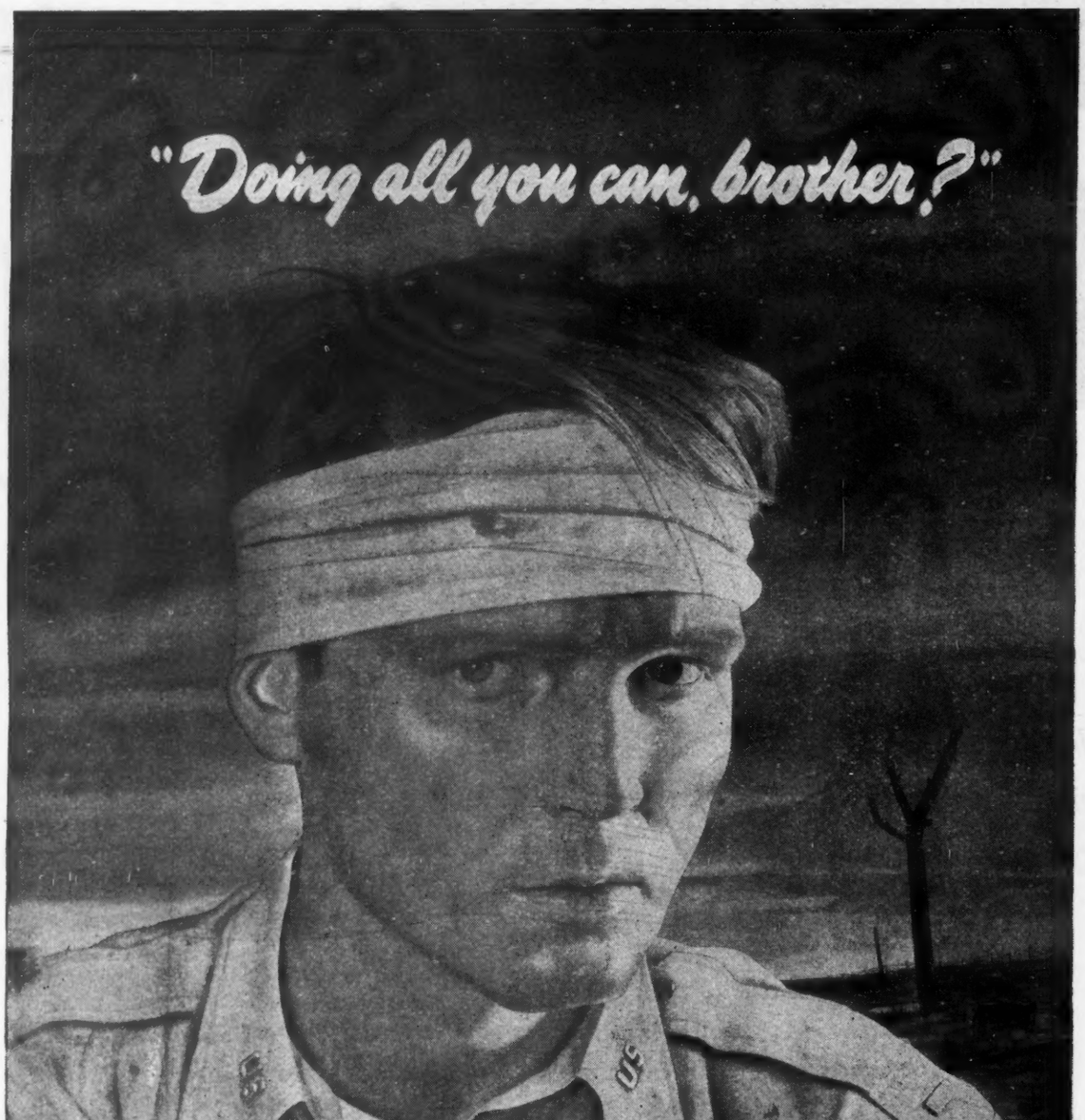
*Position*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

Buy United States War Savings Bonds and Stamps



BUELL ENGINEERING COMPANY, Inc.
8 Cedar Street, Suite 5000, New York
Sales Representatives in Principal Cities

CONSULT BUELL *First* IN DUST RECOVERY
for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

buell
DUST RECOVERY SYSTEMS

"WHAT A THING TO FIND IN FOOD ...GLASS!"

It Almost Happened

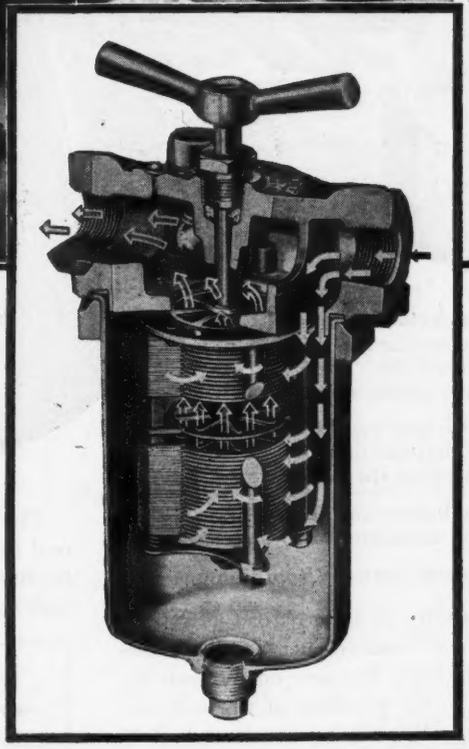
Someone — accidentally or intentionally — had dropped an electric light bulb in the liquid. The glass particles were found in the sump of the Cuno "Filter-Fine" Strainer — a much better place than on someone's dinner plate.

Cuno Auto-Kleans are used to protect the purity — and reputation — of many types of liquid and semi-liquid foods.

The filter element is non-collapsible. There's no danger of an accident (as with a wire screen strainer) letting through unwanted particles. One molasses company has Cunos on the pump line discharging from evaporators, and also on gravity filling lines to drums and tank cars.

The filtration is *selective*. Particles larger than specified are broken up or removed, smaller ones pass through (ideal for soups, fruit drinks, baby food)

Make sure every sale of your product is protected — Cuno Filters will guard your reputation.



"Quick Facts" Tells About Low Cost, Non-Stop Straining

You save money, too. Maintenance is no problem — merely turning a handle combs out accumulated (and imbedded) solids — without stopping production. Nothing to take out and clean. Nothing to replace. Read how other food manufacturers get positive, trouble-free straining — send now for "Quick Facts".

CUNO AUTO-KLEAN will protect these products from foreign solids

- Baby Foods
- Molasses
- Jellies and Preserves
- Candy
- Salad Dressings
- Cocoa Butter
- Oleomargarine
- Fruit Juices and Syrups
- Tomato Catsup
- Peanut Products
- Chocolate
- Mustard
- Lard Compounds and Substitutes

KEEP FLOW ON "GO" WITH

CUNO

THE "FILTER-FINE" STRAINER

CUNO ENGINEERING CORPORATION
405 South Vine Street, Meriden, Conn.
Send me the free booklet, "Quick Facts"
NAME.....
COMPANY.....
ADDRESS.....
Product to be strained.....

SOLVING A PAINT PROBLEM THE WAR CREATED

Canco's New Paint Container Saves Metal

IT LOOKS LIKE a regular metal paint can, but it isn't.

It's Canco's new gallon-size* paint container, made with a fibre body, enameled steel ends, inner protective lining and water-repellent outer coating.

Naturally this container isn't as strong as an all-metal can, but as a wartime substitute, it offers many advantages. Here are a few of the more important ones:

1. ***Existing*** **equipment can be used to fill, pack and handle this new package.**
2. **Since the shape is approximately the same as an all-metal can, the paint manufacturer can apply his own familiar label . . . and fully maintain his brand identity in the public mind.**
3. **It has our regular "Double-tite" friction top, as previously used on tin cans.**
4. **It is lighter and more compact than other available substitute containers.**
5. **Protects contents from light.**

**Present limitations on metal for the ends permit manufacture of the gallon size only.*

Ingenuity on the part of Canco technical and research men produced this new package. It's only one of their answers to the problems of wartime containers. We're doing our level best to meet those problems, difficult as they are, in order to facilitate the distribution of package goods for home consumption.

This work, of course, must and will proceed without interfering in any way with the large and important contribution we are making daily to the war effort.

Stop accidents NOW
—save Manpower for Warpower

Co-operate with the War Production Fund to Conserve Manpower by warning your employees not to take chances.

☆ ☆ **AMERICAN CAN COMPANY** ☆ ☆

230 PARK AVENUE, NEW YORK, N. Y.

TRANSPORTATION—a vital war factor

The effectiveness of our armed forces and civilians alike depends on the efficiency of our transportation

As the battle of Tunisia entered its final phases, with the British and American forces joining hands to crowd Rommel into his last fox hole, Hitler and Mussolini held their twelfth war-time meeting.

One important purpose of this meeting, according to the Berlin radio, was the study of a specially prepared "Survey of Continental Reserves". Topping this list of resources is the item of transportation.

Hitler has a great many headaches these days but, according to no less an authority than the Reich Ministry of Economics, "the central problem of the whole German war effort is transportation". It is, in fact, the Achilles' heel of Germany's War Machine.

The Nazis have become soberly conscious of its crucial importance and Mr. Hitler must wince when he recalls the gigantic miscalculations which led him to neglect his railways.

He counted on a short war, not a long wear-and-tear war and Germany's transportation crisis is getting more critical by the hour. It will play a vital part in its defeat.

This is a war of movement—on land, on sea and in the air. Russia's 2,000 mile battleline, R.A.F.'s 700 mile bombing raids, General Montgomery's 1,500 mile advance last November and the vast area that constitutes the theatre of war in the Pacific make this fairly obvious.

Peace will come when one side gets control over the world's supply of fuel, oil and rubber, for on these three critical materials depend all the vehicles of war—as well as of peace.

An army used to travel on its stomach. Today it travels on its fuel tank.

On the home front, transportation is no less vital. Here it is essential in getting the war workers, their raw materials and their products, to and from the mines, mills and factories that supply our armed forces and those of our Allies. Transportation is a major factor in the nation's ability to out-produce its enemies. Every known method, every type of vehicle becomes essential, for no single group of carriers, freight or passenger, can meet all our needs.

The railroads opened the vast resources of our nation and continue to be the backbone of our transportation system. Today they are doing the greatest job in their history. They are hauling more tons of freight more miles than ever before—33% more than in 1941 and 55% more than in 1918, peak year of the first World War. They are carrying more passengers more miles than ever before—80% more than in 1941 and 24% more than in 1918. They are getting more work out of each car, each engine, and each mile of track than ever before. Private operation of railroads is proving far more effective and efficient in this war than did government operation in the last war.

In contrast to Hitler's Germany, the managers of the American railroads have not neglected their plant except where government priorities forced them to do so. They are turning in an unprecedented performance despite the long starvation period to which they were subjected. During the first World War the total investment in the American railroad plant was about $18,600,000,000. Since then $12,000,000,000 have been spent on improvements and after deductions for scrapped facilities the net increase has been $8,000,000,000. Since the present war in Europe began the railroads have invested about $1,650,000,000 in further improvements, many of them to meet special war needs.

Convincing evidence of the railroads' flexibility in meeting the special needs of all-out war is their performance in coping with the movement of oil to the East Coast. In January 1942, one month following Pearl Harbor, the railroads delivered to the East Coast by tank car less than 100,000 barrels daily. By December they had stepped this up to more than 740,000 barrels and during the week ended April 3, 1943 they

This is the eleventh of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

averaged more than 900,000 barrels per day. By the end of this year they are shooting for the goal of one million barrels a day.

Unlike Germany we have not attempted to control the development and growth of motor transportation according to the "intuitions" of one man but have wisely left it in the hands of experienced competition. That is how our highway transportation system came into being. Growing public acceptance has made it an essential part of our national economy.

The motor vehicle, its limitations set only by the improved highway and the supply of fuel and rubber, has developed to undreamed of proportions. Up to a year ago private automobiles consistently moved more people more miles than *all public carriers combined.* Buses have become an accepted means of mass transportation. Local electric and interurban railways in many cases were converted to bus lines and trucks took over the local freight services. Under these improved operating conditions traffic volume increased. When the war in the Pacific made it necessary for us to conserve our supply of rubber and the U-boat depredations in the Atlantic throttled the flow of gasoline to the eastern seaboard, our motor transport was forced to grapple with the toughest problem that ever had confronted it since it became so vital a factor in the every day transportation.

The "share-the-ride" idea recognizes the need of conserving gas, oil and rubber. This particularly applies to buses, for wherever groups can be assembled for a common destination, buses can be used most effectively. The intercity bus performs for the rural areas the same service that the local bus renders for the residential areas of our cities.

Reorganization of railroad schedules, adaptation of motor transport, rearrangement of working hours, all have contributed to provide a flexible transportation service for men and materials to meet the critical needs of the war effort. Twenty thousand intercity buses are handling 635 million passengers a year which is 69 per cent more than in 1941. The fact that these buses carry a relatively larger percentage of the total coach passenger business than their seating capacity would indicate suggests that here, too, we are getting a more efficient use of these vehicles in terms of passenger loads carried. It is fortunate to note that the geographic location of most intercity bus lines does not coincide with that of the railroads but rather supplements it.

The contribution which the urban transport industry is making to the war effort becomes apparent when we consider that buses, trolley buses and street cars today carry passengers at a rate which promises to exceed the impressive total of 21 billions, as compared with 18 billions in 1942 and an average of 13½ billions for the period 1936 to 1941. And this the industry is accomplishing with a minimum of added equipment and despite a serious drain on its manpower.

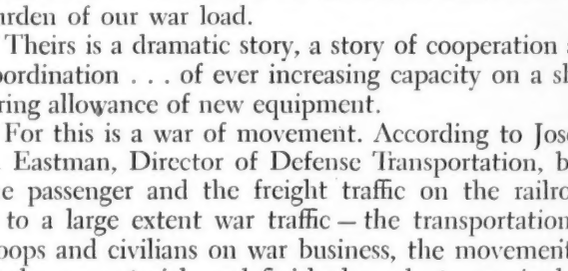
The truck lines, too, are setting all-time records. They have rearranged their schedules, eliminated circuitous routes and coordinated their services with those of other carriers. As this is written, contract truckers with the cooperation of the Office of Defense Transportation are trying to eliminate the empty return trip.

The transportation industry as a whole is face to face with the biggest job in its history. Increasing traffic loads, with little if any new equipment, difficulty in obtaining essential maintenance materials and a growing shortage of manpower, combine to make it that. While federal authorities, acting through the Office of Defense Transportation, took prompt cognizance of this condition, froze equipment and otherwise acted to conserve the vehicles then in service, it was not possible to add sufficient vehicles to keep pace with the increased traffic demand. However, the O.D.T. did lend impetus to the movement for staggering hours of work thereby spreading the peak loads and thus increasing the carrying power of existing fleets of vehicles in city service.

As we review the problems involved in meeting our transportation needs it is evident that we cannot depend upon new equipment alone for their solution. Lend-Lease is taking a considerable share of our much needed output of transportation equipment. The immediate job is up to the rank and file of the transportation industries. It is up to their resourcefulness and devotion to their job. The operating men out on the road, the men in the shops who keep the equipment going, who make the most of the metals and other materials they can have, who salvage, conserve and economize . . . these are the men who must bear the burden of our war load.

Theirs is a dramatic story, a story of cooperation and coordination . . . of ever increasing capacity on a shoestring allowance of new equipment.

For this is a war of movement. According to Joseph B. Eastman, Director of Defense Transportation, both the passenger and the freight traffic on the railroads is to a large extent war traffic – the transportation of troops and civilians on war business, the movement of food, raw materials and finished products required for the prosecution of the war. As Mr. Eastman put it, delayed arrival of troops at embarkation ports, delayed delivery of vital war materials could even conceivably mean the loss of men at the fighting front. And what Director Eastman says of the railroads applies to all forms of transportation. Transportation by bus, by street car, by truck, by train, by ship and by plane . . . all play a vital part in the achievement of victory . . . on the home front and on the fighting front which relies upon it.



President, McGraw-Hill Publishing Company, Inc.

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Taken in a plant which concentrates orange juice, the picture on the cover shows an operator checking the solids content of the juice with a refractometer. (Globe photo.)

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BRANCH OFFICES: 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; Los Angeles; St. Louis; Boston; Atlanta, Ga.

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CABLE ADDRESS: "McGraw-Hill, N. Y." Member A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index.

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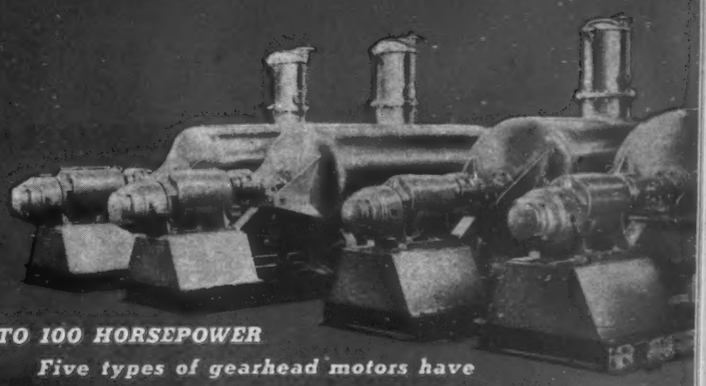
FOOD INDUSTRIES is published monthly. Price 35c per copy. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, Food Industries, 330 West 42nd St., New York, N. Y. Subscription rates: United States and possessions, Mexico, Central and South American countries, $3 a year, $4 for two years, $5 for three years. Canada, $3.50 a year; $5 for two years; $6 for three years (payable in Canadian or U. S. Funds). Great Britain and British possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 a year, $8 for two years, $10 for three years. Entered as second-class matter, Aug. 17, 1936, at Post Office, Albany, N. Y., under act of March 3, 1879.



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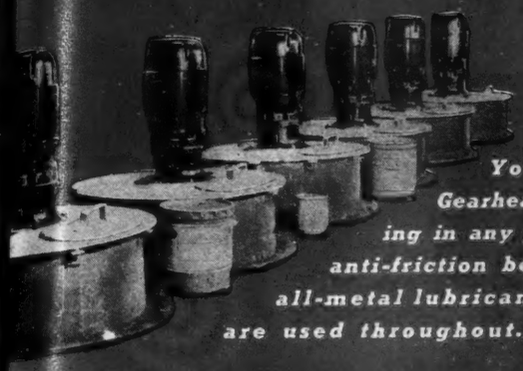
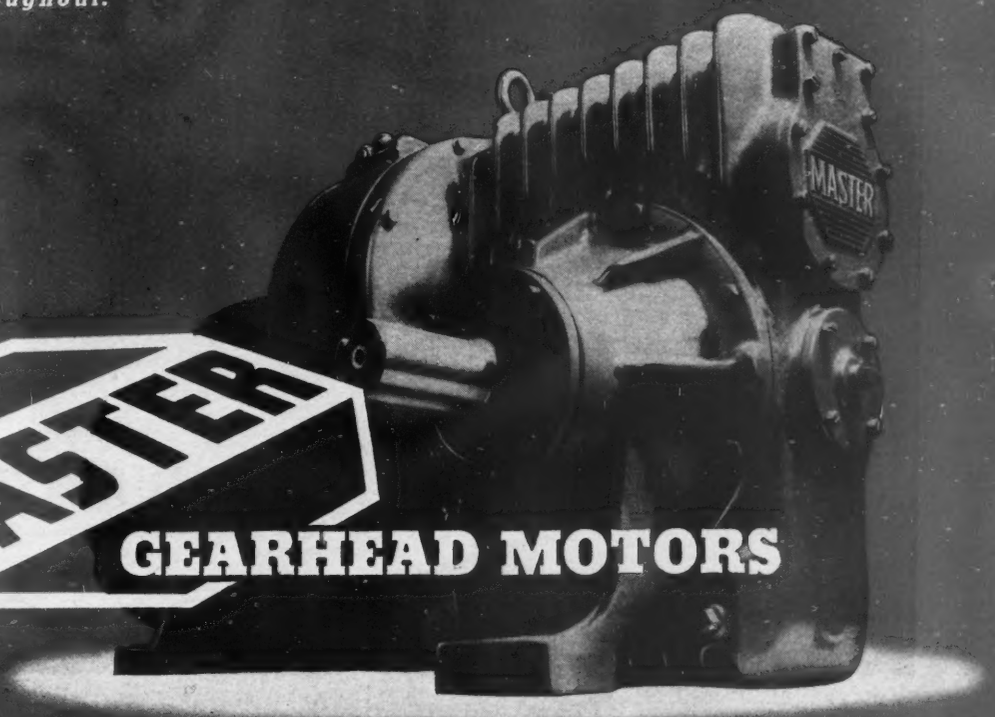
Five types of gearhead motors have reduction ratios ranging up to 432 to 1.



You can secure Master Gearhead Motors for mounting in any position because anti-friction bearings and all-metal lubricant seals are used throughout.



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Available in a wide range of types including explosion proof, splash proof, fan cooled, multi-speed, uni-brake motors and Speedrangers.

Save material and save space with simple, compact, integrally built Master gearhead motors.

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GREER CONVEYORS

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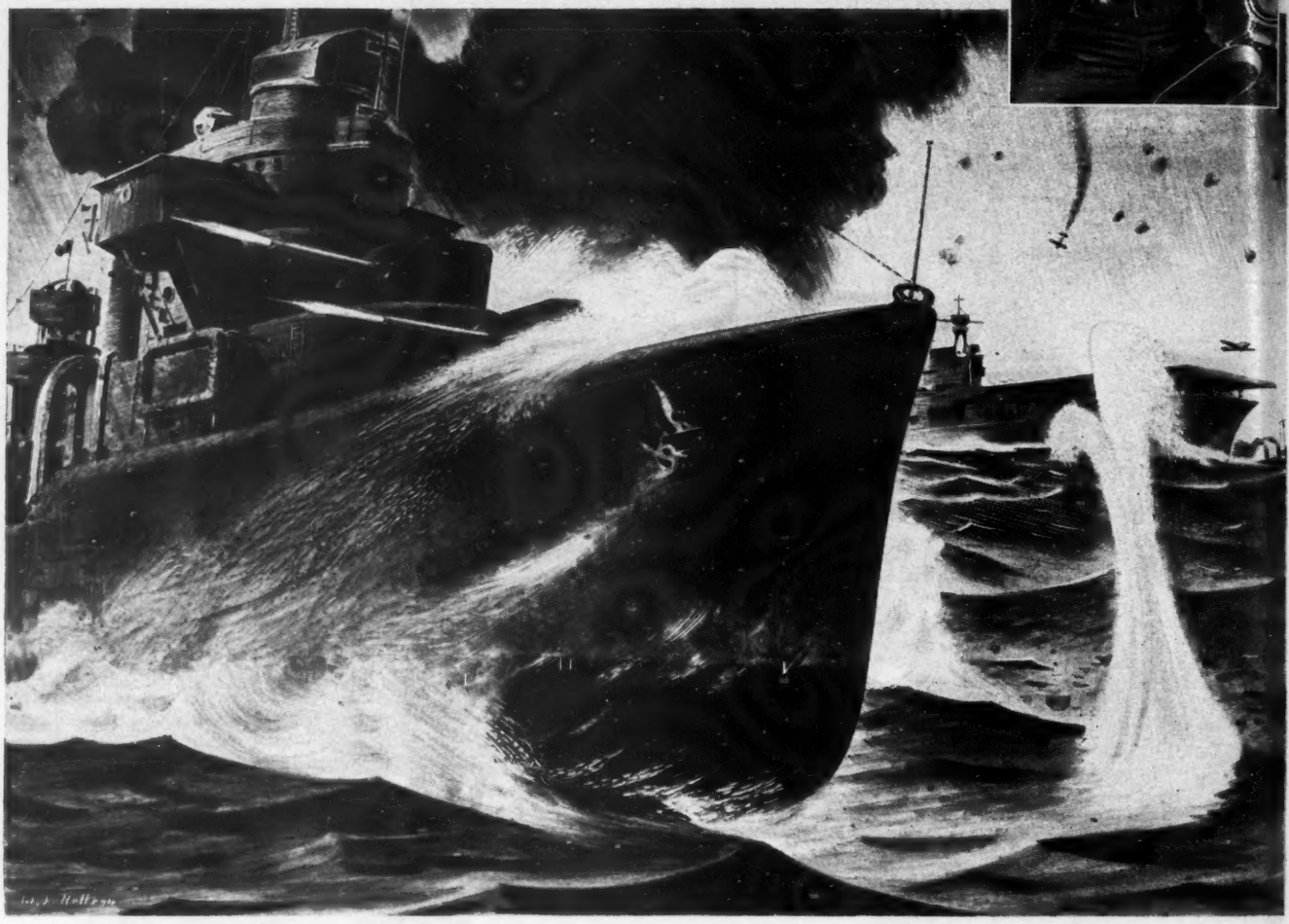

TALK has been called cheap, but not when the 5-inch guns of a destroyer's main batteries speak out. That's the most costly talk in the world—for Jap or Nazi ears. Shells are fed by Greer Hoists from the ammunition rooms to the gunners in the handling rooms of the gun turrets.

Delivering the goods, of a very different kind, has long made the Greer Conveyors famous in the confectionery and bakery fields, both here and abroad. Ammunition hoists aboard U. S. destroyers are putting to important use this ability of Greer engineers to build conveying machinery that is second to none in precision and dependability.

Today, Greer is engaged one hundred per cent in turning out essential equipment for the Navy. But we want to keep in the closest possible touch with our many friends who are using Greer Confectionery and Bakery Machines. Out of war work have come faster, better ways of doing things: this knowledge already is being used for your future advantage.

Let us cooperate with you now on your post-war plans. — J. W. Greer Co., 119 Windsor Street, Cambridge, Massachusetts.

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HOW SUGAR REFINER Improved Product and Cut Drying Costs

● Cleaner, clearer, more lustrous crystals (a more attractive product for consumer and commercial use)—less fines—less loss. Briefly these are the principal benefits obtained by Franklin Sugar Refining Co. when they adopted the Roto-Louvre method of drying their product. The single unit illustrated replaced two conventional type dryers formerly used, and in addition to occupying considerably less floor space, this Roto-Louvre Dryer has greater capacity.

Engineers who know how to solve drying and dehydrating problems such as yours, have prepared a special book on Roto-Louvre drying. It shows how this method has been successfully applied to a wide variety of drying needs. Ask for Book No. 1911.

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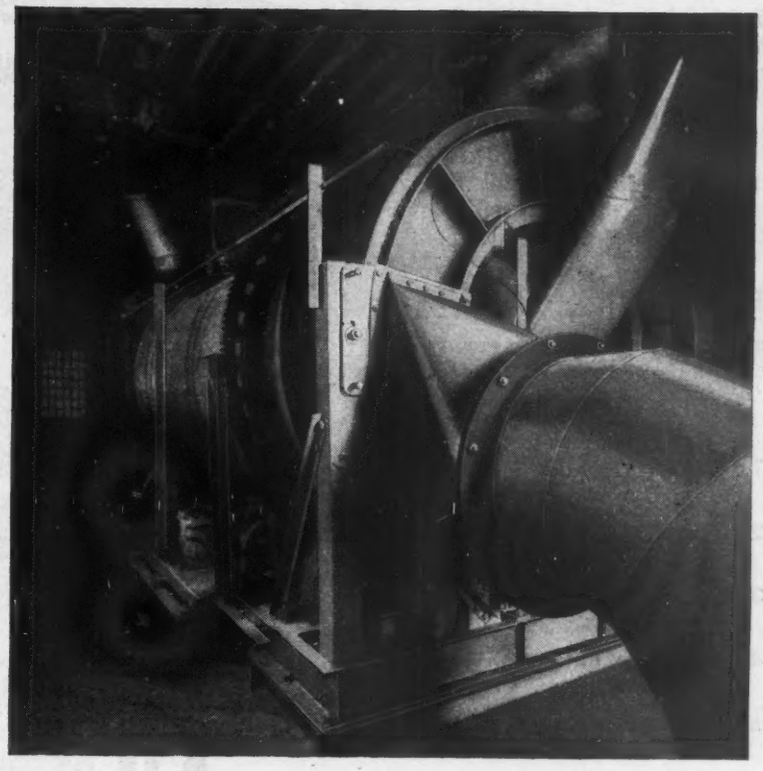
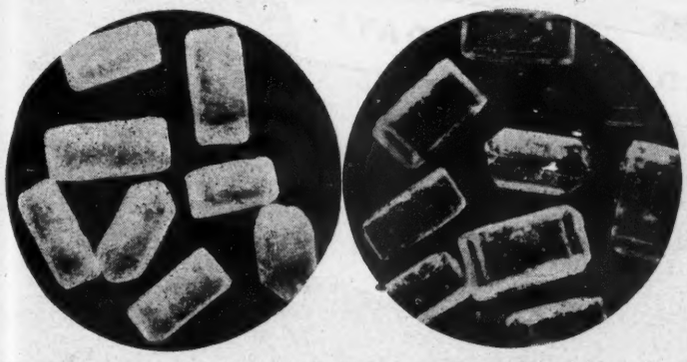


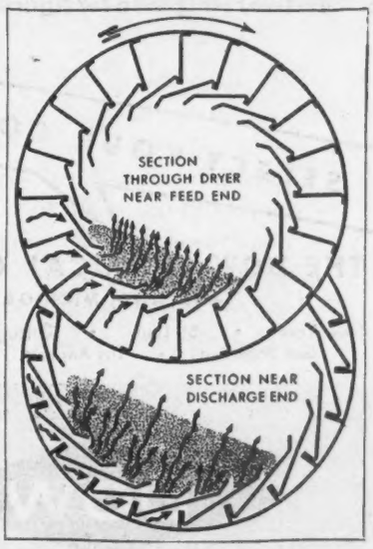


Magnified selected sugar crystals. Dull, dust-coated crystals at left are from conventional dryer; clear crystals at right from Roto-Louvre Dryer.

A FEW FACTS ON DRYING SUGAR

At Dryer Inlet: Sugar, 1.5% moisture, temperature 120° F. Inlet air, 245° F. At Dryer Outlet: Sugar, only 3/100% moisture content, temperature 130° F. Outlet Air, 135° F. Discharge Capacity: 36,000 lbs. dried sugar per hour. Moisture evaporated by dryer, 545 lbs. Handling capacity increases with decrease of inlet moisture content; and r.p.m. of dryer shell (1 to 6 r.p.m.) is regulated accordingly. On coarse special sugars, the capacity of the unit is greater because of their lower initial moisture content.

This size Roto-Louvre Dryer unit has a shell measuring 6-ft. diameter by 18-ft. long, and is rotated at one to six revolutions per minute from an electric motor. The r.p.m. of the shell can be varied as little or as much as desired, to suit the degree of moisture in the incoming sugar. This dryer combines the advantages of heat exchange by convection, hot inlet air permeating upward through the mass, controlled temperature rise for the material being dried, and the least degradation in the product. Made in eight shell diameters and in various lengths with evaporating capacities from just a few pounds to 12,000 lbs. per hour.



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LINK-BELT ROTO-LOUVRE HEAT DRYER

HOW TO BE SURE OF *Complete* FUMIGATION RESULTS

Fumigation of a building or warehouse does not in itself protect your products from infestation. *Results* tell the story. *Results* that must be complete—thorough—final.

To help you get the best results with Methyl Bromide, the fumigant that *penetrates*—the fumigant that assures a *complete* kill—Dow has prepared several short booklets covering important phases or types of fumigation. You may have them free of charge. They are designed to help you—with information that is concise—brief—and to the point.

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THE PENETRATING FUMIGANT

A Tale of Two Oranges

—with a postwar hint to packagers

THE TEST. Two groups of choice oranges from the same grove were stored in the same place, at room temperature, for four months. One group was sealed in individual wrappers of Goodyear's moisture-air-tight Pliofilm. The other group was unwrapped. The photographs above show what happened.

THE OFFICIAL REPORT, from the Agricultural Experiment Station of the University of Florida which made the test: *"The oranges wrapped in Pliofilm lost less than 2% of their initial weight after four months' storage...the original taste and appearance of the fruit were unchanged . . . Vitamin C content very slightly diminished."*

Comparable results have been obtained in tests with grapefruit, lemons, apples, peaches, mangoes and many vegetables!

THE SUGGESTION. While Pliofilm is not available now (today it is a 100% war worker), marketers are invited to consider Pliofilm as a quality safeguard in postwar packages because the enduring "keep fresh" protection of Pliofilm functions equally well in packaging cheese, meat loaf, sausage, coffee, nuts, pharmaceuticals, chemicals and other air-moisture-sensitive products. Write: Pliofilm Sales Dept., Goodyear, Akron, Ohio.

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THE GREATEST NAME IN RUBBER

Pliofilm

Pliofilm—T. M. The Goodyear Tire & Rubber Company

For "WET END" POWER to drive washers, peelers, cutters, pumps, conveyors ● The G-E Splashproof TRI-CLAD motor is unusually well protected against damage from moisture, steam, or wash water. Daily hosing down can't injure windings or bearings. Its smooth, corrosion-resisting, cast-iron exterior is easy to keep clean. It can be mounted where most convenient without the use of protecting canopies.

For LOW-SPEED DRIVES on conveyor lines ● A Tri-Clad gear-motor combines motor and speed reducer in a single compact unit. It simplifies mounting and maintenance problems, promotes safety and cleanliness. Made in a full range of sizes, and for speed requirements from 780 down to 13.5 rpm.

DEPENDABLE MOTOR POWER for fans, pumps and packaging machinery ● Standard Tri-Clad induction motors have no openings in the upper portion. Inside and out, they resist moisture, high ambient temperatures, and other unfavorable conditions. They are highly recommended for continuous operations where failure of one small motor might shut down an entire "line." Builders of pumps, fans etc., can supply them.

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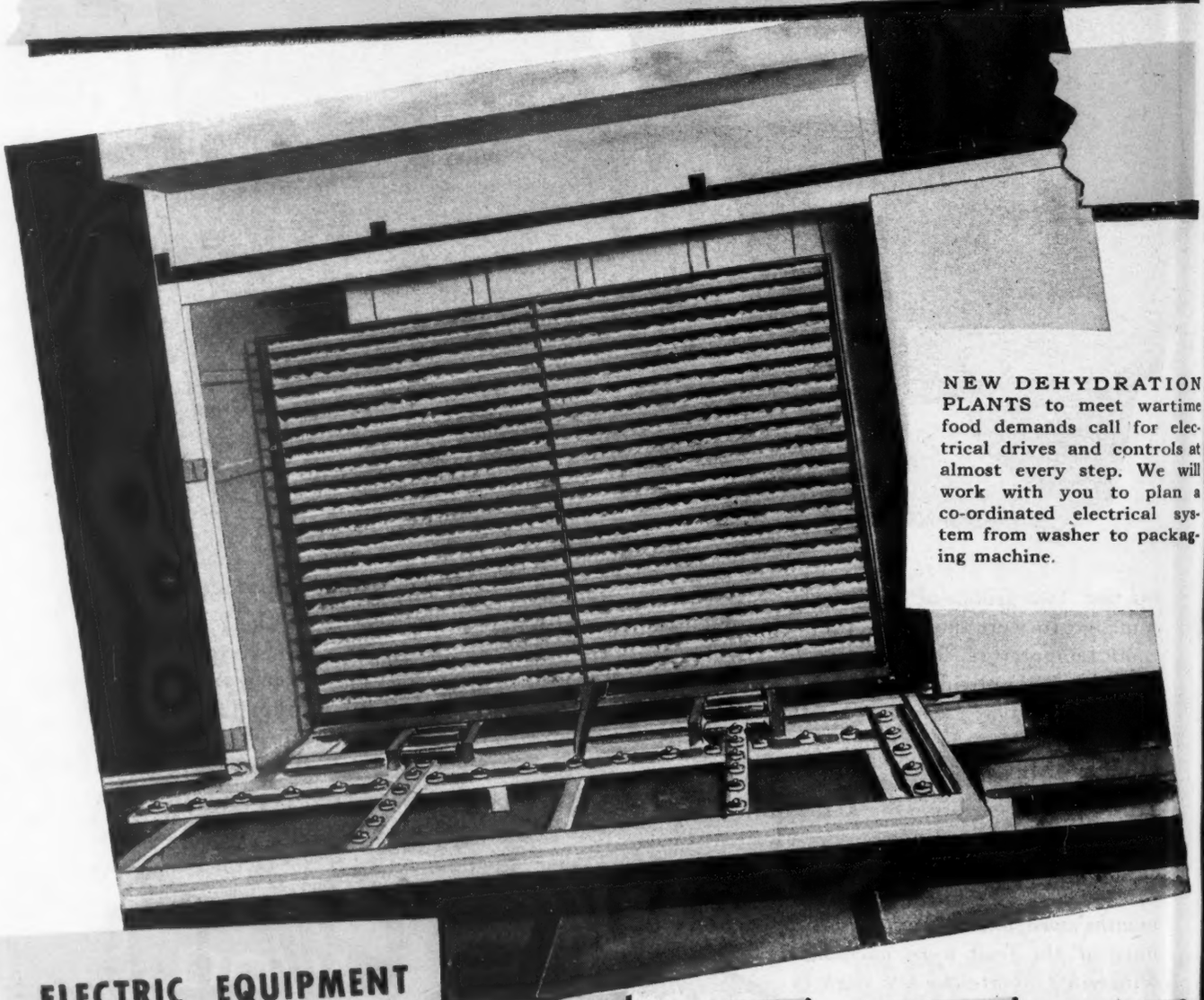

NEW DEHYDRATION PLANTS to meet wartime food demands call for electrical drives and controls at almost every step. We will work with you to plan a co-ordinated electrical system from washer to packaging machine.

ELECTRIC EQUIPMENT FOR EVERY OPERATION

Washing | **Peeling** | **Trimming** | **Slicing**

SIMPLE, CONVENIENT motor control ● Motor controls are a key factor in the continuity of process operations. By selecting from the complete line of G-E control and accessories it is possible to have the type that best meets the requirements of the job. G.E. can help you choose equipment for clean, dusty, or wet locations, or which best combines safety, reliability, and ease of installation.

For TIMING DRYING OPERATIONS and other process cycles ● General Electric time switches and other automatic controls include units exactly suited to food plant needs. The TSA-14 time switch opens and closes contacts for repeating-cycle processes, covering a total time cycle from 10 seconds to 60 minutes or longer. The TSA-10 opens or closes contacts a specified length of time after the process is begun.

For DRIVING FANS on steam-heated dryers ● These small mechanical-drive turbines (Type D) produce economical power while acting as a reducing valve to supply low-pressure steam for heating coils or other processing needs. They are particularly advantageous on dryers where fan operation and steam supply for the coils are required simultaneously. G.E. builds them in capacities from 5 hp up. Bulletin GEA-1145D gives full information.

FOR LARGE SCALE DEHYDRATION...

ARE wartime food demands bringing you face to face with new problems in mechanized food processing: how to raise output with limited man power . . . how to maintain quality with inexperienced help . . . how to switch from batch operations to continuous, large-scale production?

Then whether it's dehydration, canning, freezing, or some other branch of food technology, General Electric can help you get lined up *electrically!*

A Special Service for Food Plants

Anything that can be done electrically to speed up or improve your output can probably be done *better* with the help of G-E Application Engineers. They'll help you choose the *right* equipment—for fast installation, faithful performance, and to meet unusual or intricate processing cycles. And it will be supplied *on time*, to the full extent that your priority status permits.

Here's What to Do

If you're now laying out new food processing lines, call G.E. *before* you order your equipment. Then the electrical drives and controls can be so arranged as to "tie-in" well as a part of an integrated system. This will simplify operations and cut maintenance costs.

A call to your local G-E office will establish contact with our engineers familiar with food plant electrical requirements. *General Electric Company, Schenectady, N. Y.*

GENERAL ELECTRIC

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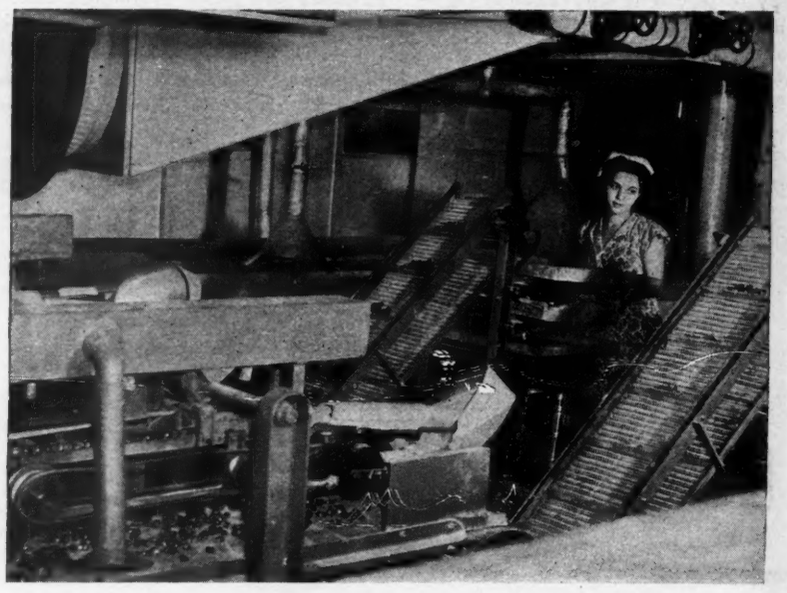
Weighing | Blanching | Traying | Drying | Inspection | Packing

ARE YOU Working Under A Cloud?



Difficult drying days, erratic behavior of processes, off-quality products, all can be caused by excessive moisture in the air. The Drug Industry discovered years ago that they can avoid many of these faults by controlling atmospheric moisture with Lectrodryers.

The packaging room pictured here is held at a definite dryness. No chance of those products picking up unwanted moisture; they leave the plant as the manufacturer intended. A Lectrodryer handles that drying job.

The Food Industry can profit by the experience of the pharmaceutical industries. Lectrodryers can help you standardize drying operations in your present driers, regardless of outside weather conditions. You can obtain a greater degree of dryness than is now possible with your present equipment. Conditioned air will safeguard the quality of products being processed and packaged.

If you have a drying problem, let us advise you on it. Lectrodryer's engineers base their recommendations on experience gained in solving hundreds of such problems, in many industries. Write PITTSBURGH LECTRODRYER CORPORATION, 301 32nd Street, Pittsburgh, Pennsylvania.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

PITTSBURGH

LECTRODRYER

CORPORATION

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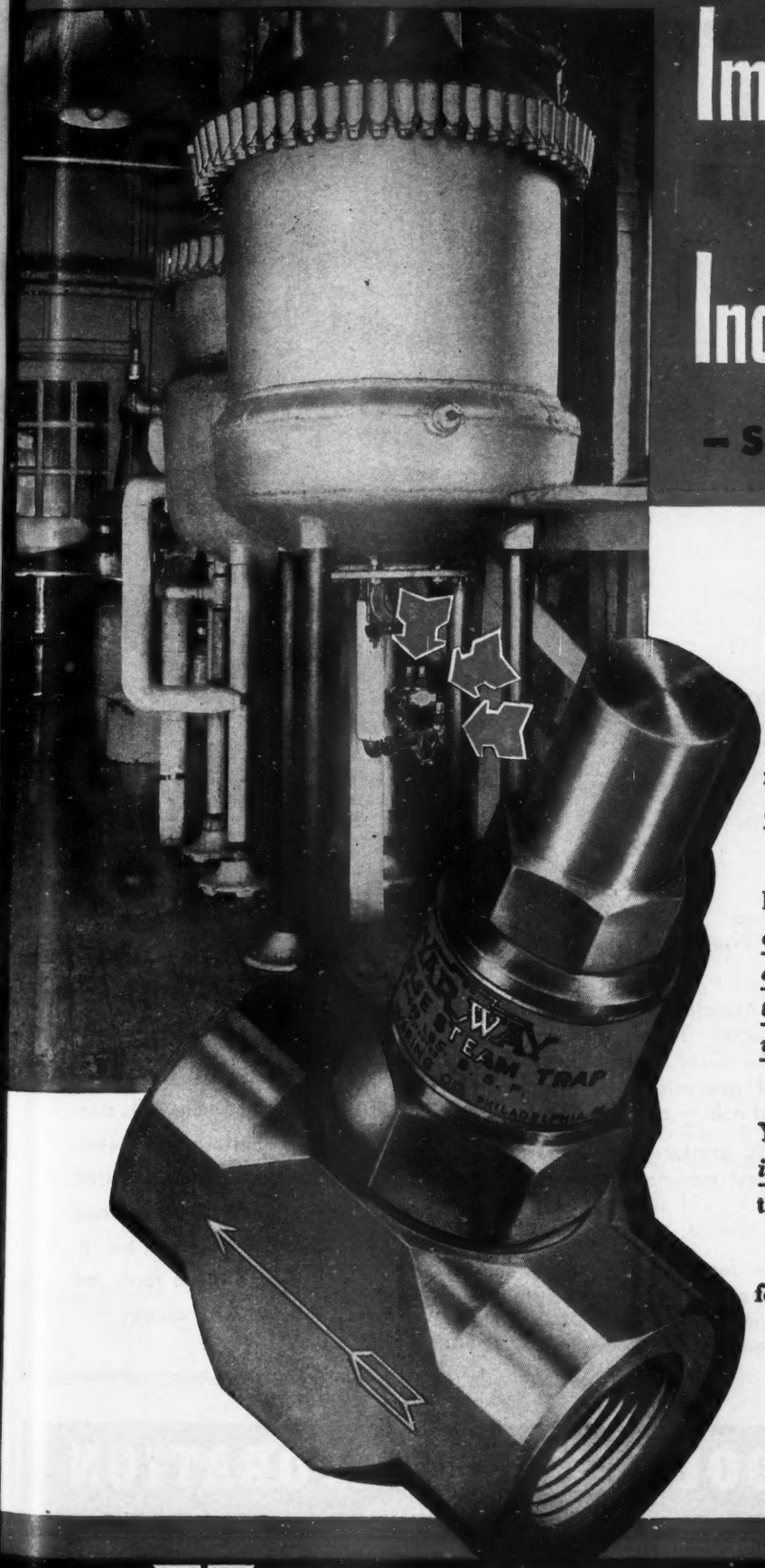
"YARWAY IMPULSE TRAPS Improved Heating and Increased Efficiency"

– Says G. W. Carnrick Co.



SINCE the first Yarway Impulse Traps were installed, the improved heating and increased efficiency obtained have induced the G. W. Carnrick Co., (makers of liver extracts and other compounds), to purchase no other make. Today, about *80 per cent of the traps in their plant are Yarways.*

You, too, can solve your trapping problem by standardizing on Yarways. They provide *quicker heating; greater sustained heating efficiency; lower installation and maintenance cost; fuel economy; saving in valuable floor space* due to their small size.

Then too, you can probably install new Yarways for *no more than the cost of repairing* the *old traps* in your plant. It is often the case.

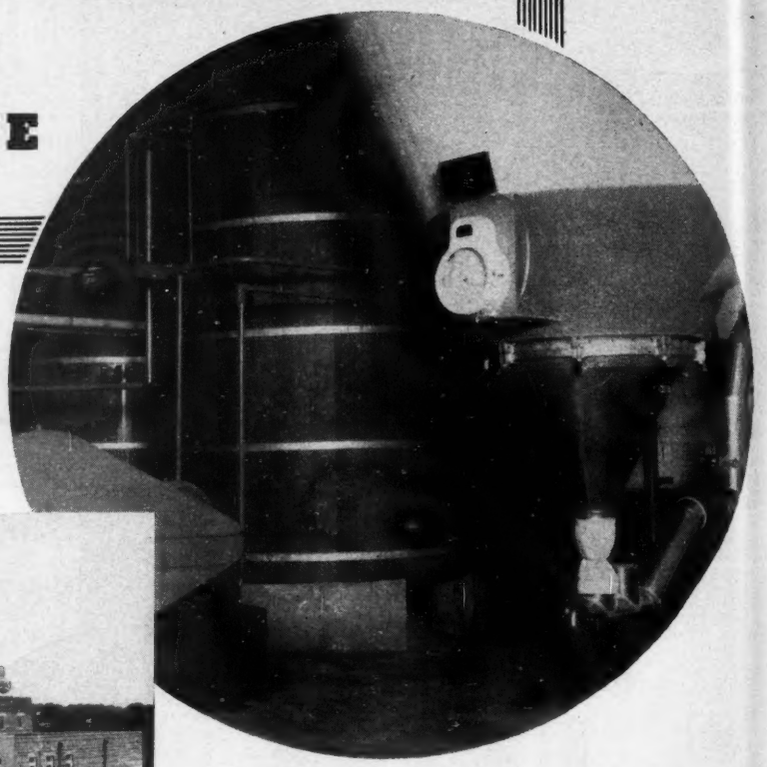
See your Mill Supply Dealer—or write for Bulletin T-1737.

•

YARNALL-WARING COMPANY
127 Mermaid Ave., Philadelphia

YARWAY IMPULSE STEAM TRAP

SPRAY PROCESS MILK POWDER EFFICIENTLY PRODUCED BY WEST COAST CO-OPERATIVE



Gray-Jenson Spray Process Drying Unit in the main plant of the Skagit County Dairymen's Association at Burlington, Washington.

Main plant of the Skagit County Dairymen's Association located at Burlington, Washington.

In war, as in peace, efficiency counts most! Man-hours are saved . . . particularly important during the war. Production costs are reduced . . . very important any time.

When the Skagit County Dairymen's Association selects equipment, efficiency of operation is a deciding factor. That is why this leading West Coast Co-operative installed the Gray-Jensen Spray Process Drying Unit — engineered, built and guaranteed by The Douthitt Corporation — to reduce its excess fluid milk to powdered form.

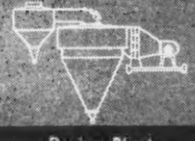
The Gray-Jensen Drying Unit efficiently produces extra grade dried milk, without loss of solids, at the lowest manufacturing cost. Semi-automatic . . . one man can operate it . . . it also saves on fuel and gives years of trouble-free, profitable service.

More and more dried milk is needed for domestic consumption and for lend-lease. If interested in the profit possibilities offered by a Gray-Jensen Spray Process milk drying installation . . . write, wire or phone . . . The Douthitt Corporation, Chicago, Illinois.

Designed for Spray Drying

Gray-Jensen Plants are designed for the spray drying of whole milk, skim milk, buttermilk, cream, ice cream mix, malted milk and all other food products that can be reduced to liquid form and handled with pumps.

Gray-Jensen Spray Process



Drying Plant

The DOUTHITT CORPORATION

CHICAGO, ILLINOIS

" . . . you'll find it WONDERFUL SOUP!"

Dear Jim:

Hope you recognize the soup in your emergency ration kit.

Remember? We were working out the package when you put on your uniform. Well, the soup got there almost as soon as you did ... and you'll find it wonderful soup!

That little packet of powder may be worth a lot more to you, some day, than a belt full of money. The package is something special. The G. I. men didn't use these words, but the package had to be ...

strong as Gibraltar
tough as a leatherneck
airproof as a blimp
moistureproof as a torpedo
light as a feather
gasproof — corrosionproof
tasteless and odorless

And so, we did it, just as they said. Now, when you have to get your own soup, sometime, in a jungle, or desert, or on a glacier, you'll have soup ... real soup ... from that little package.

When the shooting's over, you're coming back to an exciting new world. Our research men are doing some startling things for war that will be just as practical in peacetime. They'll be ready for the problems of postwar packaging, with many new methods, materials and techniques. We're hearing about some of these future problems, already.

So give the enemy the works, and get him handled. Write when you can. We'll keep you posted on the "home front". All the folks send their best to you.

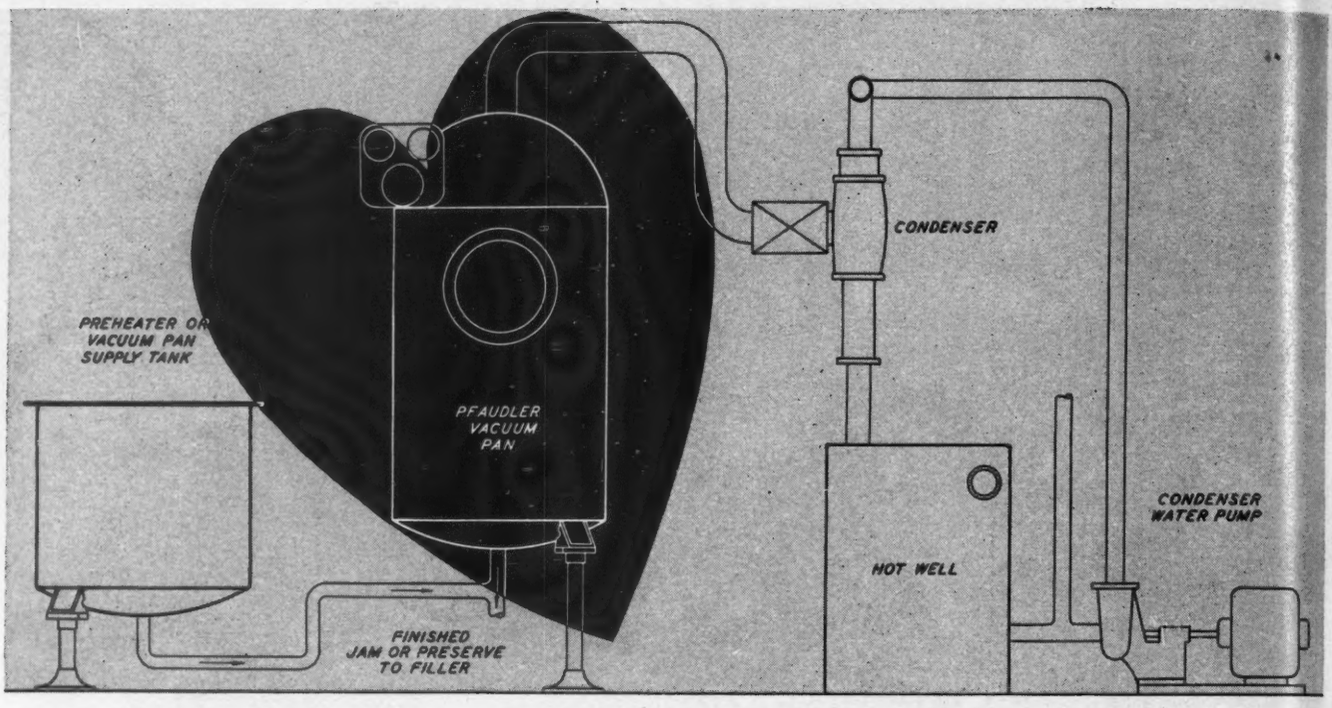
Yours,

T. F. Dolan
President

Printed "TRITECT" laminated cellophane packages protect taste and quality of this soup ration—loaded and sealed on Trans-wrap equipment. This is a typical example of Dobeckmun service in designing packages to meet specific requirements. If we can help you in your packaging problems, please call upon us.

THE DOBECKMUN COMPANY

CLEVELAND, OHIO · OAKLAND, CAL

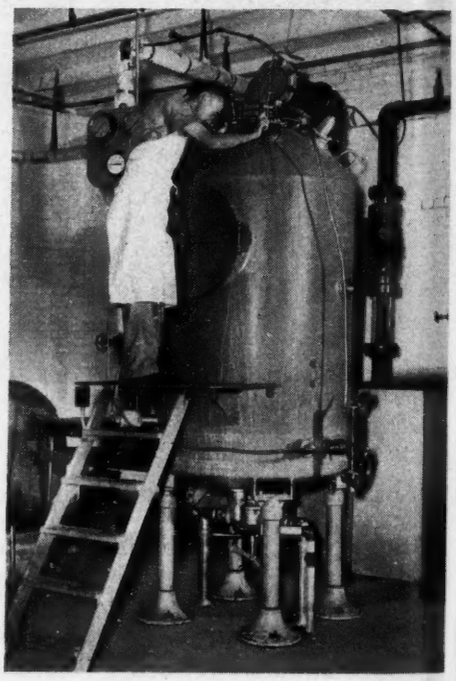


A VACUUM COOKER'S *the heart of this flow plan*

War needs have pushed the demand for processed foods to an all-time peak, but there's no lowering of the quality standards set for the armed forces. That's why you can get the priority rating needed for new Pfaudler equipment. The prime purpose of Pfaudler equipment is to bring to your processing new economy, decreased labor hours, and a better product. And that was the sole purpose of Pfaudler engineers when they designed the above flow plan for a plant which makes tomato paste, jams, jellies, preserves, and fruit concentrates. We reproduce it here because the new hook-up reduced process time and expense, cut labor costs to almost one half, and turns out a greatly improved product.

Raw materials are drawn directly from the preheater into the glass-lined vacuum cooker. Virtually all of the cooking is done at temperatures no greater than 135°F. This prevents caramelization and product breakdown. Vacuum cooking also enables you to control moisture content and results in an outstanding improvement in color and flavor. The finished jam or preserve is run off by gravity to the fillers on the floor below. The batch capacity of such a plant can be varied to make from 50 up to 1500 gallons, depending upon requirements.

Whatever your processing problem, Pfaudler engineers will be glad to work out an individual flow plan to save you money and improve the quality of your product.



Pfaudler Glass-Lined Vacuum Evaporators are available for either batch or continuous operation. Evaporators equipped with vertical short tube heat exchangers are rated for capacities ranging from 4,000 to 18,000 pounds (or more) per hour. Coil or jacketed evaporators are for batch type operation.

Since Pearl Harbor, Pfaudler has sent back more than 1,500,000 lbs. of scrap metal to the mills. Have you any scrap you can send?

PFAUDLER

THE PFAUDLER CO., Rochester, N. Y. Branch Offices: 330 West 42nd St., New York; 1442 Conway Bldg., Chicago; 1325 Howard St., San Francisco; 455 Paul Brown Bldg., St. Louis; 7310 Woodward Ave., Detroit; 1318-1st Nat'l Bank Bldg., Cincinnati; 1228 Commercial Trs. Bldg., Philadelphia; 751 Little Bldg., Boston.

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor

MAY, 1943

The Talk of the Industry

• "VITAMIZING"—a new term to add to the many new ones beginning with "Vita"—is accomplished by spraying the vegetable garden with "Vitamist." This comes in cartridges to be put on the end of the sprinkler hose. "What is Vitamist?" you ask. So do we. Burgess Seed Co., Galesburg, Mich., advertises it as "the new vitamin cartridge" at 30 for $1.00, each being enough to "vitamize" 1,500 sq.ft. of area, which does not sound like very much vitamins of any sort.

• THE POPULATION of continental United States on Jan. 1, 1943, has been calculated to be 135,604,000, an increase of 1.2 percent in twelve months, according to the Bureau of

the Census. If this rate—double the normal rate—keeps up, there is no better news for the food manufacturer's postwar planning.

• COMPARISONS are sometimes misleading, for instance the retail price index of food here with that of the United Kingdom, taking September, 1939, as 100 percent. Certain enthusiasts claim that U. K. has done a better job of price control than U. S., pointing to the higher U. S. price index as the horrible example. Latest available figures show our index figure to be 17 percent higher than U. K.'s Well, why shouldn't the U. S. price index be higher?

One of the expected direct results of sharing our food with U.K. under the Lend-Lease arrangement should be lower retail costs to our Allies.

• OPA's list of unrationed *foods* includes "fruit and vegetable dyes." Food and Drug Administration please take notice.

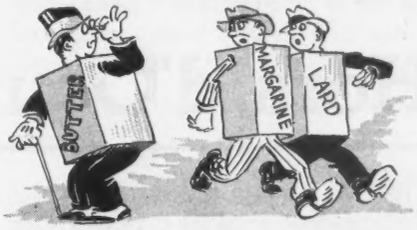
• MINNESOTA law has for many years required that all state letterheads bear the slogan "Eat More Butter." The Legislature is now in the process of repealing the law. Why not change it to read, "Wouldn't you like to eat more good Minnesota butter?"

• BLACK currants have been discovered to have the highest content of vitamin C in England. These are native shrubs. In the postwar period citrus fruit from the United States will face this new competition.

• ADVOCATES of easy money—printing press money—are learning these days that, just as increasing the number of ration points per individual cannot increase the amount of real food available, more currency does not create more real wealth.

• POSTWAR Marketing Data: The U. S. Army now owns ten of the biggest hotels in the land and has 475 others under lease. Presumably the latter will have to be completely re-equipped before they can resume civilian operations, when, as and if the Army releases them. Institutional sales managers of food companies will be much interested.

• THE National Dairy Union recently protested against grouping of butter as a fat along with margarine, lard and cooking fats, for point-rationing purposes. The Union would have



preferred to have butter grouped with cheese and other milk products unless, perchance, it could be set up in an independent category. One wonders how much it would help butter sales if consumers had been forced to choose between butter and cheese?

• FOR those who fear that the manufacture of malt beverages may be seriously curtailed by wartime necessity we suggest that any such moves on a strictly bona fide basis will be preceded by a notable rise in the disappearance of breadstuffs. If U. S. consumption plus exports of the bread grains approaches the current production, some moves of serious import may be looked for.

• SHIPPING needs for an expeditionary force are 7 tons per man originally sent across. And every month there

is needed 1½ tons of shipping per man to keep him supplied with food and equipment if he is not fighting. Thus a division of 12,000 men needs from five to ten ships, depending on the size, to transport them and at least two 10,000-ton Victory ships to keep them supplied provided these ships can make one round trip every 30 days. Multiply these figures by the necessary factor to allow for ships and cargoes lost en route.

If this division is engaged in combat the shipping needs are greatly augmented. An infantry division will shoot up about 300 tons of ammunition per day, 100 anti-aircraft guns will consume about 127 tons of ammunition a day. This gives you some idea of what is involved in beating the Axis.

If You Plan to Hire High School Children

High school children will undoubtedly have to be used in many places in processing plants where help is scarce, especially for preserving perishable crops. The most acute need will occur just about the time schools open next fall. It is not as easy to get this form of help as some persons think. And, therefore, the time to prepare the way is right now.

To talk it over with the superintendent of schools or principal of the local high school is not enough. There is also a Board of Education to be sold. The board should be convinced of the need for the move as early as possible so that the superintendent can make all the necessary arrangements before school closes in June.

But even this is not enough. The board will probably refuse to close the schools to permit a small percentage of the older pupils to work for a few weeks in early autumn. About the most that can be expected is that pupils will be excused if they work at food processing. The school board cannot compel them to work in your factory. You have the job of persuading them to work, and the time to begin all these arrangements is now. To wait until fall will make it triply difficult.

Anomalous Position Of Food Administrator

Chester Davis is a man who, it is generally admitted, knows his way around this wicked world and political Washington. He is conceded to be a good administrator, which implies that he understands the principles of organization. How, then, is it possible that he accepted appointment as Food Administrator under what constitutes an impossible organizational set-up? As Food Administrator he is subordinate to the Secretary of Agriculture, but reports to the Secretary's boss, the President. Such an arrangement will work only until the first clash.

Inasmuch as Mr. Davis knows organization, it musts be presumed that he had some sort of private understanding with the President—an understanding that will lead to a correction of the impossible situation at an early date—or else he would not have accepted the task. His friends are positive that he made sure that he had all the necessary powers before he took over. In view of all this, it would seem as if certain other important moves are likely in the near future if we are to have a really effective Food Administration.

In the meantime, the Food Administration personnel are not acting as if they had received any clean-cut directive from above, and the few decisions that have been recently obtained from Washington by food processors are largely "No."

It is to be hoped that the President will quickly clarify and rectify the weird situation. To allow it to continue any longer than is actually necessary is to prolong and aggravate the food crisis.

Hors d'Oeuvres

• *One of Borden's customers is a war worker without an alarm clock in a town that's fresh out of alarms. So the milkman gets him up by banging on his window each morning. And a year ago civic committees were trying to put silencers on milkmen.*

• More than 12 million pounds of seed for restoring farmland liberated from Axis domination was shipped abroad in one month. Literally, America is sowing the seeds of freedom over the world.

• *The governor of Virginia is reported to have warned delegates to the International Food Conference that it is against the state's laws to bring in more than a gallon of liquor per man. He must think they're going to pickle the perishables in alcohol.*

• Sign in a southern restaurant: "Mary had a little lamb. What will you have?" Lucky Mary.

• *At a war factory in England arrangements have been made with a local shopkeeper to supply goods each week to women workers. The women like it, perhaps because they are too tired to enjoy a bargain counter blitz.*

• According to a recent survey, soldiers prefer carbonated beverages to other drinks in a ratio of 4 to 1. But the boys are young yet.

• *Comes this comment from marines in the South Pacific: "Dehydrated foods have been developed to such a degree that most of the time they cannot be detected from fresh foods." Dehydrators, take a bow.*

• Slaughterhouse "speakeasies" have appeared in Philadelphia. These days "speaks" kill the product for the customer, but in Prohibition times they killed the customer with the product.

• *There are not enough horses either to make a meat problem or to solve one, says the Food Distribution Administration. But there are enough to make a lot of dinner table conversation.*

• Says the OPA, chili containing less than 20 percent meat takes no points—perhaps because it isn't chili.

• *U. S. war expenditures reached a new high of more than $7 billion in March. So when the government says we ought to buy more war bonds it's no spinach.*

F.K.L.

Supreme Court Rules On Food Standards

Of considerable importance to the food industry is the decision of the Supreme Court of the United States in Federal Security Administrator vs. Quaker Oats Co. Quaker Oats had had a run-in with the Food and Drug Administration over the enrichment of farina, where the definition and standard of identity of ordinary farina, duly promulgated under the new law, failed to include any added vitamins and minerals. Quaker Oats successfully challenged the reasonableness of the definition and standard of identity in the Federal Circuit Court of Appeals, but the Supreme Court reversed it.

As is the case in nearly all Supreme

Court contests, the court determined whether or not the Food and Drug Administration had the requisite power to do as it did, either under the Constitution, or the intent of Congress as expressed in the statute known as the Federal Food, Drug and Cosmetic Act.

In ordinary language, the Supreme Court has said that, once a definition and standard of identity has been formally adopted for a food, forever after the food must conform to that standard and definition. It cannot be less. It cannot be more. The definition fixes it throughout the life of the standard, and the standard will remain in force until it is changed in the form prescribed by the law, or until the law is changed. Nothing may be added to the food, nothing may be taken away. And that's that.

Quaker Oats had been adding an obviously valuable nutritive factor to farina, calling it "enriched with vitamin D." The Food and Drug Administration insisted that if the product were enriched at all it must contain minimum amounts of other vitamins and iron as called for by the standard for *enriched farina*, and that descriptive labeling would not be acceptable here where a standard had been set up.

To anyone who sat through the endless hearings on S. 1944, S. 2800, S. 2000 and S. 5 (the various bills that finally resulted in the present law), this ruling is the logical outcome. FOOD INDUSTRIES expressed its opinion repeatedly in those days, arousing the displeasure of many people. Our fears were expressed in the editorial, "Is This the End of Progress?" (page 481, Sept., 1939).

The difficulty of changing Federal standards of identity was viewed as an obstacle to technical progress. We still think so, but we refuse to get "het up" about the Supreme Court affirmations of what every thinking man must have known is the new law. The time for battle was years ago when the law was being written.

Two points may, however, be made regarding the Supreme Court decision. First: The unwary must be reminded that many states have adopted food laws which automatically incorporate every Federal standard. There is little escape by sticking to intrastate commerce. Second: When a hearing on a Federal standard of identity is held, all interested firms had better be ready with incontrovertable scientific evidence, presented by technical and scientific experts. To trust to lawyers alone is a waste of energy and money. Lawyers see that you get your legal rights, but scientific evidence is what counts. (And be prepared for a hearing that may last for many weary weeks.) Furthermore, hearings are called on only 30-days' notice, yet to build a good presentation usually takes a much longer preparation. Better be thinking now about new standards to be promulgated when the war emergency lets up.

Get Rid of the Lawyers!

When Prentiss Brown succeeded Leon Henderson as Administrator of OPA, he discovered that the organization included some 2,700 lawyers compared to the 10 lawyers in the British Food Ministry in London. Mr. Brown hopes to reduce this number by a couple of thousand, a consummation devoutly to be wished.

But he had better get rid of some of his theoretical economists at the same time. A young squirt lawyer or economist in an administrative post is still a young squirt with a college education, untempered by long contact with realities.

Speaking of economists, it is seldom that a professional economist has any knowledge of the economics of perishables. And the way in which food rationing has been handled is adequate enough proof of OPA ignorance of this subject as well as ignorance of the behavior of people. OPA lawyers and economists seemingly need to learn the hard way and at public expense about the law of supply and demand. Many of their ilk denied the existence of any such law when prices were reckoned only in dollars and cents. Today when prices in money are secondary to prices in ration points, OPA lawyers and economists are afforded a splendid example of the complete stoppage of sales when point prices are too high, regardless of dollar prices. This is a supply-demand manifestation, in which the supply is the consumer's stamps in the family ration books and the demand is OPA's point requirement for an article of food. The supply is fixed and the demand is almost equally rigid, though OPA can and has changed some point values.

Under such rigid conditions either a food does or does not sell. Witness the recent experience with dried legumes, frozen foods of all sorts, choice cuts of meats and dried fruits. The storekeeper has no latitude of action. If foods do not sell he may not legally cut the point value and move the goods.

OPA recently complained publicly that the public's refusal to buy when point values were too high was defeating the whole rationing scheme. If the scheme doesn't work, is the public wrong? That's good lawyer philosophy, just about as good as 16 points for a porterhouse steak, one-half bone, at 63 cents a pound. If Harvard Law School teaching is no better than that, it would be well to turn the place over to the WAACS, WAVES or SPARS.

OPA delayed plenty long in announcing 1943 ceiling prices for food processors with the result that acreage contracts are delayed and processed food production is reduced in a year when we need it enlarged. Practical food men sent delegations to OPA and finally appealed to Congress for a decision while there was yet time. Only a legal mind would delay under the circumstances.

If Prentiss Brown expects to do a job or if he needs a flock of scapegoats, the next move is obvious.

I.F.T. Meets at St. Louis

The annual convention of the Institute of Food Technologists will be held at Hotel Statler, St. Louis, Mo., June 2, 3 and 4. With food preservation and packaging problems becoming more serious with each passing month, this meeting is one of the most important ever held by the I.F.T. (see page 94 for the tentative program). Non-members are admitted on payment of registration fee.

Exit, 1-Trip Beer Bottles

That war causes profound changes in the life of a nation is a trite saying. Many are speculating on the rereversibility of these changes. The beer can, for example, disappeared about a year ago, and now an amendment to WPB order L-103 nearly eliminates the one-trip beer bottle, only export shipments to armed forces being permitted. Created to compete with the beer can, the one trip bottle has had only a short

existence which has been full of problems because, though it was a no-deposit bottle, many consumers insisted on getting money back for returned bottles regardless of no-deposit.

Will the one-trip no-deposit bottle come back after the war? It would appear that it won't unless the can comes back, which would divide the decision between can makers and brewers.

In fact, the P-140 order of WPB may ultimately do away with most bottled beer sales outside of local distribution areas because of the scarcity of shipping containers and the low priority for beverage cases.

High Cost of Ignorance

One of the first seizures of a dehydrated vegetable has been reported recently in "Notices of Judgment." The product was called "Toasted Onion Powder," a term that is suggestive of the claims made more than 20 years ago for a certain make of evaporated milk which had been overheated and its lactose caramelized. Making a virtue of necessity, the unlucky manufacturer of the milk product advertised it as "the milk with the almond flavor."

Toasted onion powder sounds as if it might have been *scorched* onion powder.

But "toasting" was not the trouble. The product was libeled, condemned by default and destroyed because it "contained insect fragments and excreta." In all, there was 5,400 lb. in the lot, which, at 46 cents a pound, represents a tidy sum of money.

Prevention of losses like this creates a credit that should be entered on the profit side of the books when appraising the value of quality control.

P.S.: The dehydrator is now bankrupt.

New Adhesive Problem

In the process of learning how to package dehydrated foods in paper containers that are water and insect proof, moisture-vapor proof and gas tight, some interesting aspects of packaging are coming to light. In particular, the problem concerns sealing the package. For a dehydrated food having, say, 4 percent moisture, is itself a dehydrating agent which will quickly reduce the moisture content of the internal atmosphere of a package to a very dry state indeed.

Thus the seal of such a package is exposed to extreme differences of moisture vapor between the outside and inside. In testing the efficacy of the adhesive by normal procedures, the differential may be of the order of 95 to 99 percent relative humidity. The outside may be wet or in a saturated atmosphere, while the inside of the seam may be exposed to about 1 or 2 percent relative humidity.

If the adhesive is one that loses its adhesiveness by extreme drying, the package will begin to become unsealed from the inside outward. If, however, the adhesive loosens as a result of prolonged exposure to high humidity, or actual wetness, the package will unseal from the outside inwardly.

Somewhat similar problems obtain where the wrapping material or package is built up by laminating dissimilar materials in order to incorporate proper characteristics into the packaging material. Where edges are exposed either inside or outside the package, the same sort of difficulty must be anticipated and eliminated.

Efforts to substitute paper packages for metal containers for dehydrated foods have uncovered some difficult problems that are not easily solved under today's scarcities.

What's In A Name?

Every now and then the question of identity of a food arises. In the early days when the Food and Drug Administration was a part of the Department of Agriculture, what the department called a food had an importance that no longer holds. For the Food and Drug Administration is now under the jurisdiction of the Federal Security Agency.

Nevertheless, the OWI released a document (Charles-AG-3367–4026) dated March 3, on behalf of the Department of Agriculture, containing these interesting products under the classification "Grain and Cereal Products":

Buttermilk, dried	Liver and glandular meal
Citrus pulp	Oyster shell flour
Dried whey	Oyster shell grits
Feeding oil	Stock salt
Fish meal	

This may be trivial today, but you might find it handy some day in the future to know what USDA considers under the title of "Grain and Cereal Products."

Where the Meat Goes

During the March-April clamor for beef, the Lend-Lease Administration denied its responsibility for the beef shortage, saying that it had exported less than 1 percent of our beef supply. This is probably true, but it does not explain the beef shortage. If, however, we tabulate the figures in the news which the L-LA released on March 29, something emerges that makes sense. In this tabulation (see accompanying table) the method of evaluation is Lend-Lease's or OWI's —not ours—and is obviously a method of minimizing the problem.

You are warranted in making a careful study of that table if you want to understand current scarcities. According to E. R. Stettinius' own statement, one-fifth of our available mutton supply and one-tenth of our available pork was exported to our allies in one-sixth of a year (January and February). Is it at all strange that the public, with plenty of money, would then turn to beef for its meat? Especially when the civilian supply is far less than normal because of huge demand by the armed forces?

In drawing attention to these figures, it is not for the purpose of condemning the shipment of food to our allies but to bring the Lend-Lease food exports into perspective.

Lend-Lease Exports of Food

Food item	1943 rate of export per person in U. S. Per week	Per Year	Exports per 1,000 units of U. S. production Total 1942	Rate in 1943 in Jan.-Feb.	Percent of domestic supply
Beef	¼ oz.	¾ lb.	2 lb.	10 lb.	1.0
Pork	3 oz.	9¾ lb.	98 lb.	116 lb.	11.6
Mutton	⅓ oz.	2 lb.	4 lb.	219 lb.	21.9
Milk products, inc. cheese	.....	.....	34 qt.	18 qt.	1.8
Cheese	.....	.....	230 lb.	46 lb.	4.6
Vegetable oil and lard	.....	.....	132 lb.	122 lb.	12.2
Butter	¼ oz. (2 mos.)	1½ lb.	.....	6 lb.	0.6
Eggs	1 egg	52 eggs	.....	141 eggs	14.1
Canned vegetables	.....	.....	8 cans	5 cans	0.5
Canned fruit and juices	.....	.....	17 cans	8 cans	0.8
Canned fish	.....	.....	71 cans	118 cans	11.8
Dried beans	.....	.....	50 lb.	170 lb.	17.0
Dried peas	.....	.....	60 lb.	157 lb.	15.7
Dried fruit	.....	.....	290 lb.	157 lb.	15.7

Multistage Dehydration Produces Better Food at Lower Cost

By L. V. BURTON, Editor of "Food Industries."

Experience shows that dehydrated vegetables keep 50 percent longer for each 1 percent reduction in moisture content at the 5 percent level. Single-stage dehydraters cannot produce this degree of dryness as economically as the multistage

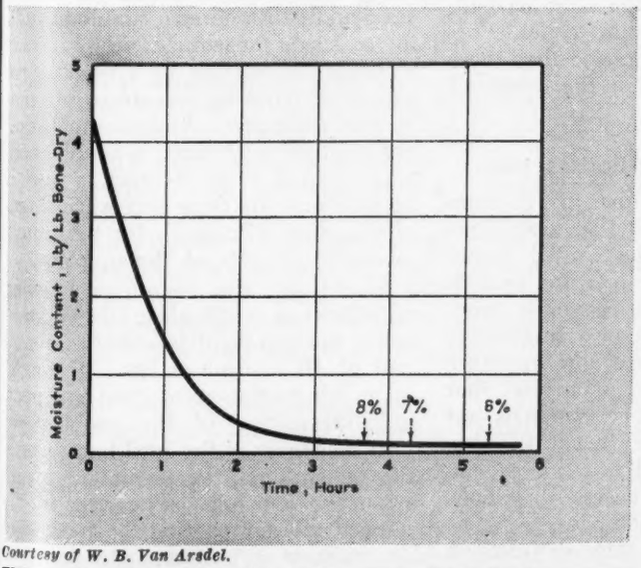
IN early 1942, most of the government's purchases of dehydrated vegetables were produced in single tunnel dehydraters. But by midsummer many plant operators were doing their final drying in a "finishing bin," also called an "equalizing bin." The latter is merely a special kind of drying equipment used separately from the tunnel to get out the last few percent of the moisture. Back of the use of this newer drying technic was the discovery by research chemists in the Department of Agriculture that the keeping quality of dehydrated vegetables is greater the lower the moisture content. This discovery was quickly reflected in the government's purchasing specifications. Whereas a final moisture content of 9 percent may have once been specified, the Army desired 5 percent and in some cases still lower percentages. This came about because of the discovery that in the vicinity of 5 percent moisture content, dehydrated vegetables have a 50 percent longer "life" for each 1 percent reduction.

Changes Required

To reach the desired further degree of dryness in a single tunnel dehydrater required certain changes of operating conditions that did not always result in a wholly satisfactory product.

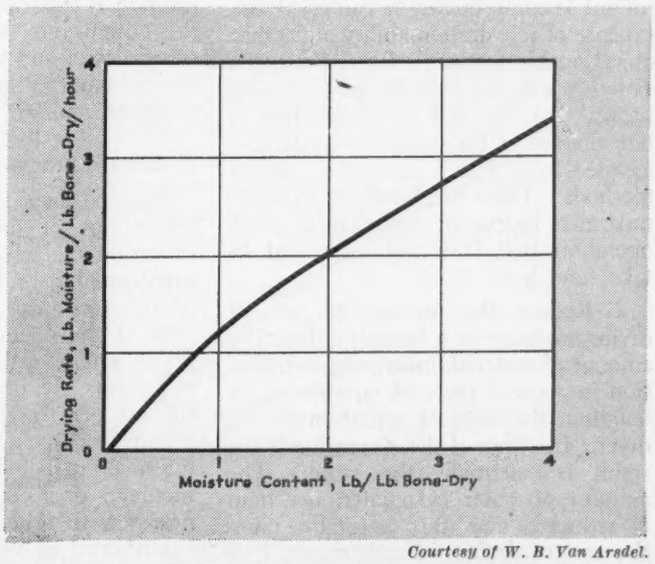
Consider a single tunnel, with countercurrent flow, holding ten cars of a vegetable at various degrees of dryness from 80 percent moisture ($T = 4.0$) to 9 percent, with incoming hot air having a dry-bulb temperature of 165 deg. F., a wet-bulb temperature of 95 deg. F. (more easily stated as $\frac{165}{95}$) and an air velocity of 1,000 ft, per minute. The retention time in the tunnel will be about 6 hours. To dry the product to still lower than 9 percent of moisture, several things may be done:

1. Initial dry-bulb temperature may be increased to, say, 180 deg. F. but this temperature may be excessively high for the nearly dry material and may scorch and discolor it. It must be remembered that the drier a substance the slower the rate of evaporation of the residual moisture and consequently the greater the progressive sensitivity of the substance to heat. Unless the product is continuously cooled by the rapid evaporation of moisture from its surface, its temperature will rise to an approximation of the dry-bulb temperature. At the rapid rate of drying used in commercial dehydration, the material stays very nearly at wet-bulb temperatures until about one-half of its moisture is lost. The temperature then rises gradually, and practically reaches dry-bulb temperature about the time the moisture is reduced to one-fourth the original



Courtesy of W. B. Van Arsdel.

FIG. 1. A typical vegetable drying curve shown in the manner utilized by heating and ventilating engineers. Russet potato, blanched, 5/32-in. strips, wood-slat tray, load 1.5 lb. per square foot, cross circulation, air velocity 500 f.p.m., air temperature 150 deg. F. dry-bulb, 90 deg. F. wet-bulb.



Courtesy of W. B. Van Arsdel.

FIG. 2. Rate of drying decreases from start to finish. Data are same as in Fig. 1. Figures representing moisture content are term "T," meaning pounds of water per pound of bone-dry substance at any stage of drying. Curve really starts at upper right and ends at lower left, and shows rate of loss.

FIG. 3. Regardless of the names applied to parts of the drying operations each is one stage of dehydration. This diagram shows a four-stage operation, combining "predryer," center-exhaust tunnel and "finishing bin," exemplifying multistage dehydration.

content. For example, in the case of potatoes the product is at or near the dry-bulb temperature, where $T = 1$ or less. ($T = 1$ at 50 percent moisture in the case of potatoes. For an explanation of the term T, see FOOD INDUSTRIES, November, 1942, page 47.)

Hence, raising the initial temperature to attain a lower final moisture content at the dry end may be at the cost of quality. And government specifications have been very rigid on discolored materials, allowing only 2 percent by weight. It is possible that the present requirements may be modified in the future, however.

To be sure, the final inspection on the belt will remove much of this discolored material, but the entire lot may be slightly darker. At this point it should be pointed out that the merits of the government's specifications are not a matter of debate here. It is admitted, however, that some manufacturers believe that excessively low moisture content is a fetish—that the quality of the dehydrated material is permanently altered by too low a final moisture content—that the longer resultant keeping quality is gained at the expense of rehydration ability and other objectionable features. Recent research experience to the contrary, however, has shown that the ease of rehydration is not affected if the moisture content is lowered from 5 to 2 percent by proper methods. There are, however, so many unknown factors in dehydrating plant operation that it is not expedient to take sides here.

2. Reduce the number of cars of drying material in a tunnel, reduce the amount of material undergoing dehydration in a given piece of equipment, or lengthen the time of retention in the dryer. In either of these expedients the result is essentially the same: The amount of water evaporated per hour is reduced, and this naturally raises the cost of drying. Furthermore, it is a case of slowing down what could be a rapid drying operation in the initial drying period to the slowest rate of drying in the latter end of the cycle. This will be discussed more fully later on in this article.

3. Increase the air velocity. This is accomplished by a moderate increase in electric power consumption and consumption of slightly more fuel to heat the additional air. Increased rate of air flow does, however, permit an increase of recirculation with its attendant economy, which tends to offset the increased cost. But, like the preceding alternatives, it does not really accomplish the desired results in an economical manner. The crux of the problem lies in the vegetable itself, not in the adjustment of the controls.

The real reason for the uneconomic character of such an expedient is found in the slowness with which a piece of partially dehydrated vegetable gives up its moisture—the dryer it is, the slower is the process of removing the moisture that remains. (See Fig. 1, a typical vegetable drying curve.)

4. Stop recirculation of any warm moist air. Here again the fuel economy gained by partial recirculation is lost. Partially compensating this, however, is the fact that as the wet-bulb depression increases at the finishing end, the equilibrium moisture content becomes lower and lower, and thus there comes about a gain in the speed of moisture removal.

Single Stage Not Satisfactory

From a large number of personal inspections of dehydration operations in various parts of the United States, supplemented by the foregoing analysis of the technical and economic problems of the operation of a single-stage dryer where extremely low moisture end-points are desired, it appears that the use of a single-stage system is not sound food technology where the drying medium is heated air. (This commentary does not necessarily apply, however, to other methods.)

Criticism of single-stage dehydration to extremely low moisture content by hot air may be summarized as follows:

1. It omits consideration of the heat sensitivity of most foods.

2. It omits consideration of the progressive increase in heat sensitivity to hot air of all foods parallel to diminishing moisture content. (Heat damage is probably also due to time of exposure to hot air as well as to product temperature.)

3. It omits consideration of basic engineering economies, by attempting to accomplish in one step that which could be more economically done in a sequence of steps.

4. Single-stage dehydration of food by hot air is a primitive method which, though satisfactory for its original purpose of drying fruits down to about 25 percent moisture content, is roughly comparable to the place of the one-cylinder automobile engine in the field of automotive transportation.

To expand this idea further, the criticism is not directed against the equipment so much as against the manner in which the equipment is used. It must be remembered that low-moisture dehydration is really a job of fine workmanship if it is done well. In other lines of endeavor it is well recognized that it is impossible to cut, grind and polish a metal simultaneously in a single machine, yet in low-moisture dehydration by a single stage we are undertaking a problem of comparable difficulty. A single tool cannot simultaneously saw a piece of wood, plane it and sand it—such a job is possible only by three successive stages of operation. So much for the purely qualitative aspects of the problem.

There are also sound engineering criticisms of single-stage dehydration where the end-point is a moisture content of 10 percent or less. If single-stage dehydration were good engineering, irrespective of the problem of heat sensitivity of the food being dried, the design would be predicated on an erroneous principle. The error is the implied assumption that the food loses its water at a uniform rate per unit of time in the dryer. As a matter of fact, the rate of loss is constantly diminishing, as shown in Fig. 1. In Fig. 2, the rate of drying has been

computed from the data of Fig. 1, and shows the decline of rate from $T = 4$ to $T = 0$. (The blanched material before drying, $T = 4$, is shown at the right-hand end. As moisture leaves the product and T becomes progressively smaller, the rate of loss is progressively lower.) The diminishing rate is measured by the slope of the tangent to the curve (see Fig. 1). At the outset of the drying the rate is very high, while at the end of several hours the rate of moisture loss is very slow. If the equipment is designed to utilize the most rapid rate it will be less efficient at any other rate. On the other hand, if it is designed for utilizing the slowest rate of moisture loss it will also be inefficient in the early stages of rapid loss. All single-stage operations are, perforce, compromises that attempt to strike an average, when as a matter of fact the average has no real existence.

When the dehydrater was originally applied to the drying of prunes, apricots and raisins, it was expected to reduce the moisture content from about 65 percent to about 25 percent, and the dehydrater operated in that region of the moisture-loss curve in which the rate of loss from start to finish did not importantly differ. For this reason a heated-air dehydrater in a single stage of operation would produce a satisfactory fruit product, and its engineering economics were reasonably sound.

But when dehydration, as applied to vegetables, must proceed farther along the moisture-loss curve—where the rate of loss is materially diminished with each passing hour until removal of each percent of original moisture becomes a very slow process—then a new set of conditions has been reached where it is uneconomic to compromise. The time has come, from purely engineering considerations, to depart from the original process when it has reached that practical limit for which it was designed. At that limit, the product should be removed from its original conditions of drying environment and started to dry again under different and more favorable conditions. This will involve a second stage of dehydration.

Observation of practices throughout the country reveal that many operators here and there are reaching similar conclusions largely by trial-and-error experience. The so-called equalizing bin is but an unconscious recognition of these principles. The center-exhaust tunnel, developed originally by Cecil C. Eidt of Canada, is a recognition of the value of two-stage drying.

The cabinet dryer used by Dry Pack Corp. for the past four years or more embodies the same principle of adaptation of the drying environment to the changing characteristics of the food undergoing dehydration. The same can be said of the drying procedure developed by California Vegetable Concentrates, Inc., Anabolic Food Products Co., and Rogers Food Co. Some of these companies have gone far beyond the two-stage process. Dry Pack uses a multiple-stage "program control" that is specific for every product and amounts to about 5-stage drying, while CVC and Anabolic use four stages. Beech-Nut Packing Co. uses a center-exhaust tunnel and an equalizing bin thus employing three stages. H. J. Heinz Co. will use this combination plus a "pre-dryer," thus making four stages.

Here are cases where the art seems to have preceded the science by a year or two, and with so many instances of better products by multistage dehydration than by a single-stage operation there appears to be no sound reason for questioning the technical value of the multistage operation.

It is not rash nor unscientific to state categorically that there is no sense or profit in scorching a food product, or cutting down its rate of production, or blowing a hurricane through it at the finishing end, or wasting heat when the same objective can be attained by much simpler and less destructive or less wasteful methods.

Dehydraters Improperly Used

The commentary about the operation in use in many plants today is not so much against the equipment but against the manner of its use. Plants which have several pieces of drying equipment use them in what may be termed a parallel operation (to borrow a term from electrical engineering) when a unit-operation study would reveal that a few changes permitting operation in series, or in a multiple-series, would prove not only more efficient but might produce a greater volume of better product.

It is unfortunate indeed that many fundamental data regarding the properties of vegetables are lacking today. When these data are available it will be much easier to design a correct system of dehydration for any vegetable (or other food) whose characteristics are definitely known.

The missing data are for the most part information about the rate of diffusion of moisture from the inside to the surface of a food at various stages of dehydration from normal raw moisture content down to about 1 percent of moisture. This must be known for every type of food and for each variety within that type.

Next are needed data regarding the losses of vitamins at various percentages of moisture and various wet-bulb temperatures, and perhaps at various wet-bulb depressions for it is possible that the rate of evaporation from the surface may have some unrecognized effect on vitamins.

Also urgently needed are data on the effect of various wet-bulb temperatures for various periods of time during drying on that elusive thing called edible quality. There is a tendency to associate the presence of normal amounts of ascorbic acid with the presence of normal edible quality, but though this seems to be fairly well established in the case of frozen vegetables, it appears to be unsafe to reason by analogy where dehydrated vegetables are concerned.

Further important needs are: Foolproof tests that reveal definitely when the factors that bring about deterioration of quality are removed, be they enzymes or what; definite knowledge regarding the so-called regeneration of heat-destroyed enzymes; knowledge of the nature of chemical changes that occur on storage of dehydrated vegetables; knowledge of the changes that foods undergo when dehydrated below 8 or 9 percent of moisture, or below what some persons call the critical moisture content—are foods thereby permanently "denatured," or can they be restored?

Lacking almost every form of data on which to base exact conclusions regarding the proper basis for dehydrater design, yet facing an imperative wartime emergency, we must proceed intuitively to try to bridge the gap between the little that is known and the ideal conditions for perfect dehydration. On the preceding basis one must be bold indeed to engineer a process far in advance of the fundamental science on which sound engineering must rest.

With the hope that the scientist will soon supply the missing proof that the technologist was correct in his assumptions, the case for multistage dehydration is regarded as established. The next steps are to describe what are probably good multistage operating conditions for vegetables (to be published soon).

Acknowledgment is gratefully given to W. B. Van Arsdel, of the Western Regional Research Laboratory, Albany, Calif., for reading this article in manuscript form and for several useful suggestions that have been incorporated herein.—L.V.B.

Small Dehydraters for Vegetables

By S. G. DAVIS, W. B. ESSELEN, JR., and F. P. GRIFFITHS
Food Technology Laboratory, Massachusetts State College, Amherst, Mass.

PART I*—General factors governing small-scale or home dehydration of vegetables and the design and construction of small dehydrating units are discussed in the first half of this two-part article.

THE importance of dehydrated foods to the world at war has been publicized to such an extent that it needs little introduction. In this war, one of the major problems is to keep supplies moving to all parts of the world, and among supplies food is always a prime necessity. The ideal way of shipping most foods, of which an average of 85 percent of the fresh weight is water, is in the dehydrated form. They weigh from one-fifth to one-twientieth as much as the canned products, and occupy from one-half to one-tenth the volume. The importance of dehydrated foods is not limited to the battle fronts. Indications are that an increase in civilian consumption and production of dehydrated foods is vitally necessary. Vegetable production has been greatly increased by the use of land never before under cultivation, in the form of "Victory Gardens" and the like. This factor and the shortage of tin, steel and rubber, as well as manufacturing restrictions on home freezers and other types of equipment, emphasizes the necessity for alternate methods of domestic food preservation.

In considering dehydrated foods it is well to bear in mind that any dehydrated food has undergone special processing in the course of preparation, and when prepared for the table it will retain certain characteristics due to such processes. Just as it is impossible to compare dried prunes, apricots or raisins with the fresh fruits or canned products made from these fruits, so it is impossible to compare dehydrated foods with the fresh or canned product on the basis of original flavor and appearance. While it is true that most vegetables do not undergo such marked changes in general characteristics as the examples just cited, those changes which do take place should not be judged as deleterious simply because of taste prejudice and the lack of a proper basis for comparison. The quality of different lots of dehydrated foods of the same type can be readily judged and compared.

Aside from palatability and appearance, the quality of any foodstuff must be judged on the basis of its nutritive value. Unfortunately, only meager data are available on the nutritive value of dehydrated foods, although considerable work along this line is in progress in this and other laboratories. In such studies not only the losses in preparation, but the losses on storage and under varying conditions of storage must be considered. In this respect, the variety of the vegetable may also be of importance.

* Contribution No. 476 of the Massachusetts Agricultural Experiment Station.

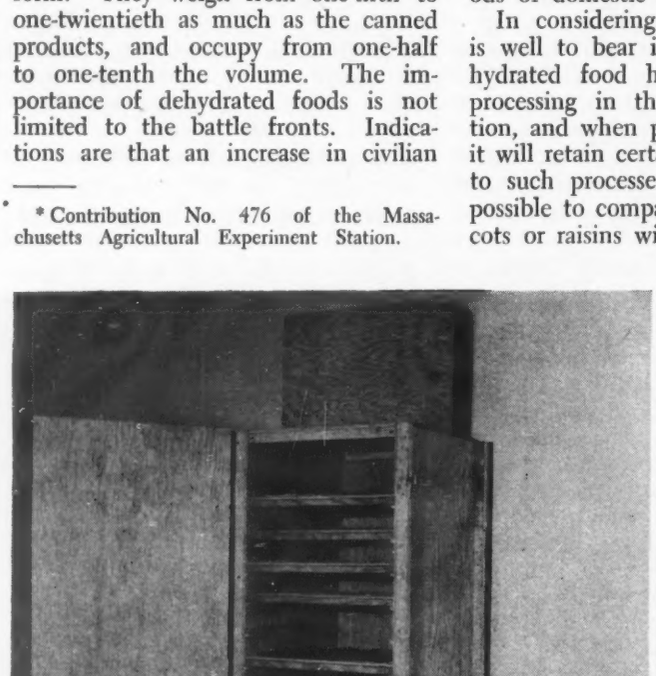


FIG. 1. Construction of the natural-draft, or Type 1, home dehydrater is shown by this photograph.

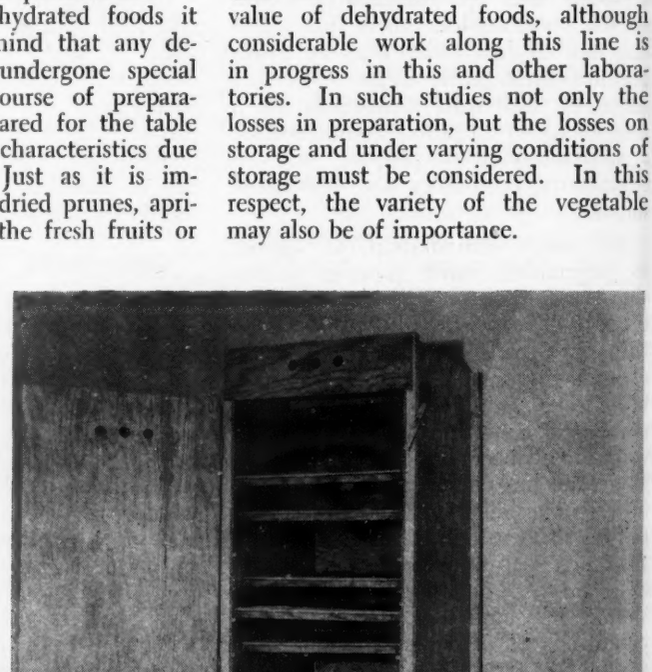


FIG. 2. The Type 2 home dehydrater is similar to the Type 1 in construction, but substitutes forced draft for natural draft.

Tressler (1942) in a review of the available literature, found considerable contradictory data, particularly in relation to vitamin retention. This appears to be due, in many instances, to different methods of preparing the products tested, and in the light of more recent knowledge of preparation methods many of these data are of little value. While comprehensive research is still lacking on most of these subjects, from the limited investigations on processing certain general statements can be made.

The greatest loss of water-soluble constituents occurs during the blanching process, the loss being greater when water is used as the blanching medium than when the materials are subjected to live steam. Magoon and Culpepper (1924), in studies on the blanching of vegetables for canning, found losses of 1.5 to 30 percent of the water-soluble constituents in water blanching, and relatively little loss in live steam. More recently, Adam, Horner, and Stanworth (1942), in quantitative studies on the effect of blanching on vegetable nutrients, submitted data which again showed the superiority of steam blanching in regard to retention of nutrients.

Little material is as yet available on the nutrient losses that occur during the actual dehydration process, but analysis of foods prepared and dehydrated under properly controlled conditions would indicate that they compare quite favorably in nutritive value with similar products preserved by canning. Morgan and Lackey (1934), in comparative studies on the retention of nutrients in spinach, found 100 percent retention of thiamin in untreated, dehydrated spinach, and 77 percent retention in spinach which was steamed for two minutes before dehydration. Canned spinach retained 26 percent of the vitamin. Their report also showed 100 percent retention of minerals in the untreated dehydrated product. These data indicate little or no loss of the water-soluble constituents during the actual dehydrating process. It should be noted, however, that 2-minute steaming is not sufficient properly to blanch spinach. Experiments in this laboratory show 78 percent retention of the minerals in spinach subjected to live steam for 7 minutes previous to dehydration, which compares quite favorably with data on the canned product.

Although dehydrated foods, like foods preserved by other methods, undergo a proportional loss of some of the vitamins and minerals during the processes of preparation, their value as a source of energy should not be disregarded. In an all-out war program, and with the increasing scarcity of foods, the problem of supplying an adequate energy intake is also of paramount importance.

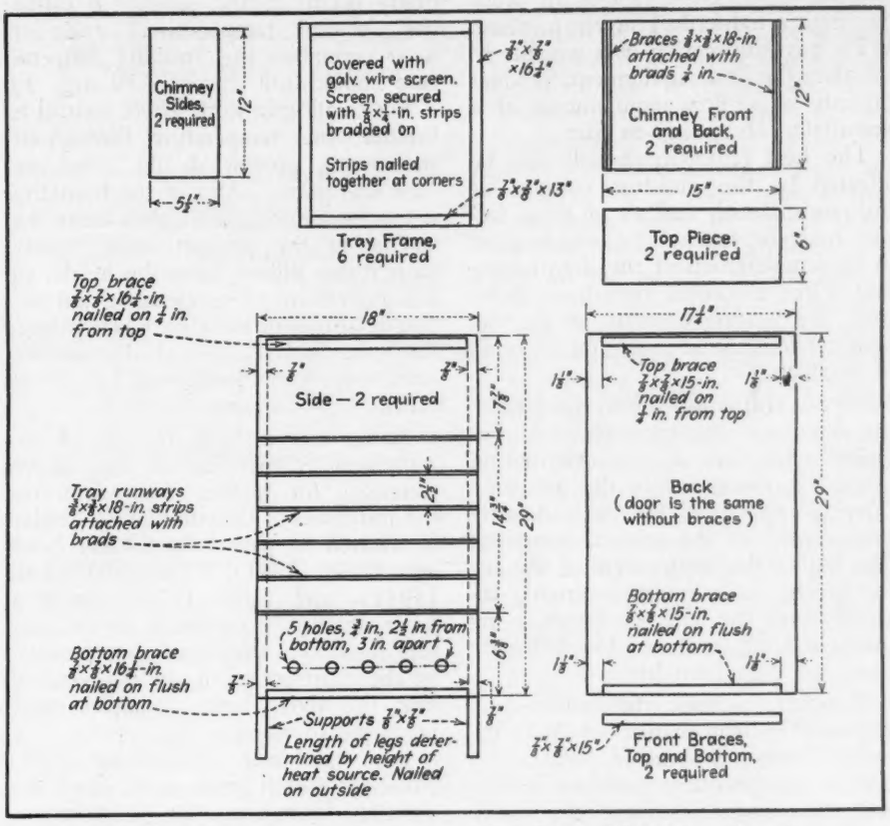


FIG. 3. Construction details of natural-draft home dehydrater—Type 1.

Equipment

Dehydration as applied to foods is generally defined as the evaporation of moisture from the product by artificial heat under carefully controlled conditions of temperature, humidity and air flow. This process involves bringing currents of relatively dry air into intimate contact with the material to be dried. Although the principles of dehydration are well known, a brief summary of the functions of the various factors—heat, humidity and air flow—in the dehydrating process should be included for a clear understanding of the problems involved in small scale work.

Functions of Air—Air is the common medium used in the dehydration process, in which capacity it acts as a carrier for both heat and moisture. It conveys the heat from the heat source to the product, and at the same time picks up the moisture liberated by the product. It then acts to carry off this moisture. A given amount of heated air passing over a moist surface undergoes a drop in temperature proportional to the amount of moisture picked up. Other conditions being equal, the rate of dehydration is directly proportional to the volume of air passing over the product. For that reason, a dehydrating unit must be provided with a means for circulation of the air.

Functions of Heat—Energy in the form of heat is required not only for vaporization of the moisture, but also to drive the moisture from the cells to the surface of the product where vaporization can take place. The conditions producing these results are fixed by definite physical laws. As has already been stated, heat lost by the drying medium in passing over the product is proportional to the amount of moisture picked up and carried away, approximately 1,000 B.t.u. of heat being required to convert one pound of water to vapor (latent heat of vaporization). This value is fixed whether vapor is formed at the boiling point or below.

Since one B.t.u. is the amount of heat required to raise one pound of water one degree Fahrenheit, conversely, one B.t.u. of heat must be liberated when the temperature of one pound of water drops one degree Fahrenheit. A similar relationship holds for change in air temperature. Although the value varies with temperature because of expansion of air on heating, for purposes of calculation the generally accepted figure is that 0.01807 B.t.u. of heat is

released as one cubic foot of air drops one degree Fahrenheit in temperature. With this information it is possible to calculate the heat requirement, product capacity or air-flow requirements of a dehydrater of any given size.

The heat requirement will also be affected by the moisture content of the raw material, and all of these factors must be taken into consideration in the construction of the dehydrating unit. For successful operation, therefore, the heating capacity of the dehydrater must be adequate for all types of products.

Effects of Humidity—From the preceding discussion the importance of humidity conditions in the dehydration process is obvious, since the moisture-carrying capacity of the air is directly proportional to the relative humidity. The higher the temperature of the air, the greater is its moisture-carrying capacity, and the rate of moisture removal is more rapid at a low humidity than at a high humidity.

However, certain limitations are imposed by the nature of the material being dehydrated. Above a certain temperature, injurious effects will be produced upon the product from excessive heat, particularly during the latter stages of the drying process. The point at which injury occurs to the product is called the "critical temperature," and for most vegetables the finishing temperature should not exceed 150 deg. F.

For small-scale work where control is limited, the temperature throughout the drying process should never exceed this point. Also, if the humidity is too low, moisture is taken from the surface of the product more rapidly than it can diffuse from the inside, so a median point of temperature and air-flow relationship must be taken to prevent the formation of a dry outside layer, or "case hardening" as it is called.

Since only a brief resumé of information is included in the above summary, for further information on the principles of dehydration the reader is referred to papers by Chace, Noel and Pease (1941), Cruess and Mrak (1941), and Eidt (1938), giving a more detailed explanation of the factors involved in the dehydration process. In the construction of any dehydrating unit the above basic principles must be borne in mind.

For small-scale dehydration work, particularly with home units, there are definite limitations to construction. The dehydrater must be simple enough in design so that an average person can build it with ordinary home tools. Critical materials should be avoided as much as possible in construction. However, it should afford maximum control of the factors involved in dehydration and produce results as quickly and efficiently as possible.

While several units have been built and tested in the laboratory, the following two designs are recommended for both simplicity in construction and efficiency of operation. Both of these are similar in size and structure, the size having been determined on the basis of operation over one gas or electric stove unit. The small one- or two-burner hot plates found in many homes are ideal heat sources for these dehydraters. The volume of drying air is approximately 5.25 cu. ft., and with six trays totaling 10 sq. ft. of drying area, the capacity of the dehydrater is 8 to 12 lb. of prepared product (equivalent to 9 to 14 pints of canned product). The tray loading is governed by the type of product to be dried, varying on an average from 1.25 lb. of leafy vegetables to 2 lb. of root vegetables per tray.

When a coal or wood stove is to be used as a source of heat an increase in size of the dehydrater is permissible owing to the increased heating area afforded by such an arrangement, but it is well to keep all dimensions in

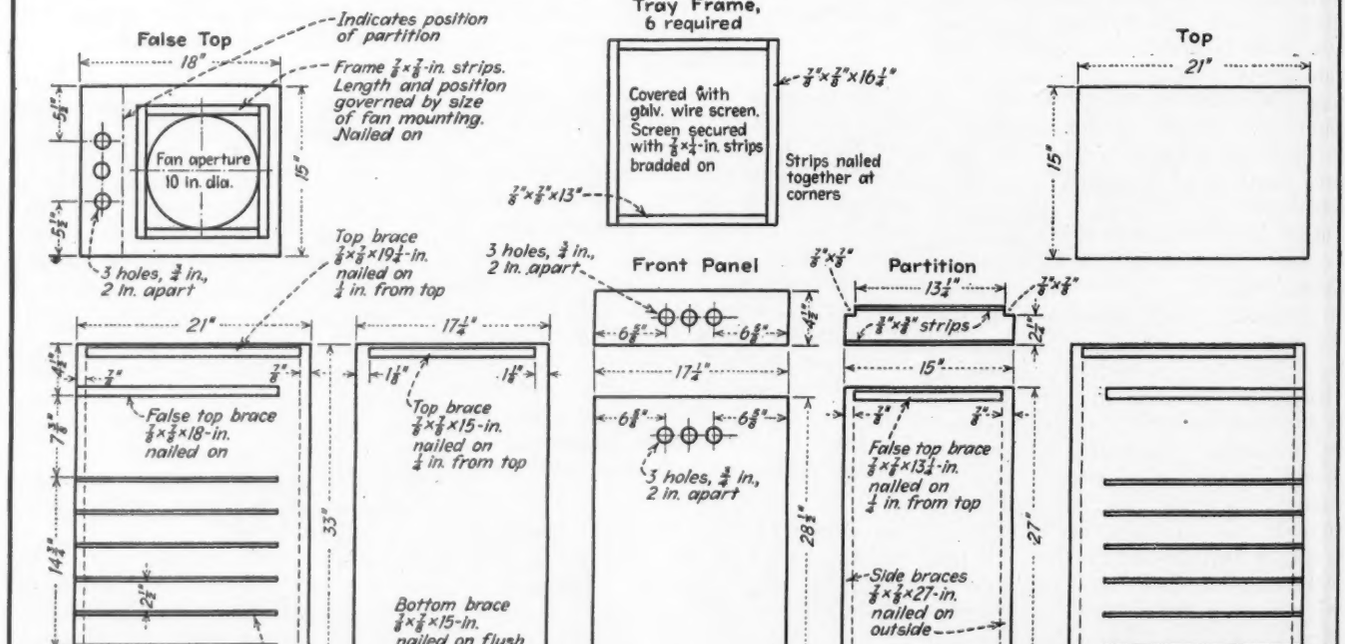

False Top
Indicates position of partition
Frame ⅞×⅞-in. strips. Length and position governed by size of fan mounting. Nailed on
Fan aperture 10 in. dia.
3 holes, ¾ in., 2 in. apart
Top brace ⅞×⅞×19¼-in. nailed on ¼ in. from top
Tray Frame, 6 required
Covered with galv. wire screen. Screen secured with ⅞×¼-in. strips bradded on
Strips nailed together at corners
Top
Front Panel
Partition
⅞"×⅞" strips
False top brace ⅞×⅞×18-in. nailed on
Top brace ⅞×⅞×15-in. nailed on ¼ in. from top
Bottom brace ⅞×⅞×15-in. nailed on flush at bottom
Tray runways ¾×¾×18-in. attached with brads
Supports ⅞"×⅞". Length of legs determined by height of heat source. Nailed on outside
Front
Back
Left Side
Back
Door
False top brace ⅞×⅞×13¼-in. nailed on ¼ in. from top
Side braces ⅞×⅞×27-in. nailed on outside
False Back
Back
Front
Right Side
(dimensions same as for left side)

FIG. 4. Construction details of forced-draft home dehydrater—Type 2.

proportion for maximum efficiency. Since uniformity of temperature is a necessary requisite for satisfactory products, care must be taken that the heat from the stove does not fluctuate widely during the drying period.

Construction Details

Figures 1 and 2 show the types of dehydraters recommended. Type 1 is a natural-draft dehydrater, and Type 2 is a forced-air unit which allows for recirculation of a portion of the heated air. The forced air unit can also be heated with a 250-watt "Glocoil" of the type used in the common home reflecting bowl heaters, thereby eliminating the need for an external heat source. The convenience of this arrangement recommends its use whenever possible.

Plywood, ¼ in., 3 ply, was used for construction of the dehydraters in the laboratory because of the ease in working with materials of this type. However, heavier plywoods, certain composition boards, and lumber from boxes and crates are equally satisfactory. Lumber from crates was used for the structural members of the experimental units. Tray frames, also made from crate lumber, were covered with galvanized screen, and 24-gage galvanized iron sheet was used for the bottom heat spreader. If metal is not available, cheese cloth may be used in making the trays and tin cans may be cut up and joined together to form a suitable heat spreader.

Dimensions and structural details are shown in the line diagrams (Figs. 3 and 4). While these diagrams are designed for work with ¼-in. plywood or similar materials in which the pieces can be cut complete to size, when individual pieces of wood from crates or boxes are used the supports should be laid out to size first and the individual boards nailed on to fit. The thickness of the material used must be considered and allowances made when nailing the braces to the finished panels. Care should be taken that braces and cross pieces are measured and cut accurately, because these pieces determine the inside dimensions of the cabinet. When the panels are completed they are nailed together to form the cabinet as illustrated. All nailing should be done through the board into a structural member.

The length of the legs depends upon the height of the heat source, and they should be of such length that the heat spreader is 6 in. above the source. On dehydraters to be used with wood or coal stoves, the legs should be made from spikes, pieces of pipe or scrap metal.

Materials Required

32 sq. ft. plywood (1 piece 4x8 ft.) for walls, top, chimney, etc.	$1.75
56 ft. ⅞x⅞ strips for supports, braces, tray frames, etc.	
18 ft. ⅜x⅜ strips for tray slides	
32 ft. ⅞x¼ strips for screen strips	
All of these pieces can be cut from a 12-ft. piece of 2x4	0.50
½ lb. 3-penny nails	0.10
¼ lb. ¾-in. brads	0.10
2 2-in. hinges with ¾-in. screws	0.30
5 ft. 14-mesh galvanized screen, 30-in. width, for trays	0.50
1 piece, 18x17¼, 24-gage galvanized sheet, for heat spreader	0.50
Total	$3.75
Additional material required for forced-air unit with electric heating element:	
1 250-watt heating unit and socket	0.75
1 sheet 18x17¼ asbestos (or other fireproof material)	0.50
10 ft. of household electric wire	0.30
	$1.55
Less $0.50 for heat spreader	0.50
	$1.05
	3.75
Total	$4.80

In hanging the door, the hinges are screwed to the outside of the door panel first, and after the door has been fitted into position the other butts of the hinges are screwed to the left hand support so that the door fits tightly.

The bottom dimensions of the cabinet should be checked before cutting the heat spreader, to insure proper fit. This piece is then nailed on or tightly wired to the side and bottom braces. While there is little danger of fire if the cabinet is properly constructed, as a safety measure the bottom braces and the lower 6 in. of the side and back panels and door should be given a thorough coating, inside and out, with a heavy sodium silicate (water-glass) solution or other fireproof material.

The natural draft dehydrater was found to be very similar in appearance to the cabinet dryer described by the U. S. Department of Agriculture Bureau of Home Economics (1942). Dimensions and structural details differ in several respects, and a chimney of larger size is employed. A chimney of the dimensions given was found to be necessary in order to produce sufficient draft for better general distribution of heat in all parts of the cabinet. The air inlets on the sides are so placed and of such total area that practically uniform temperature is maintained on all of the trays.

In the construction of the forced-air unit, an ordinary household fan with a blade diameter of 10 in. was used. This was removed from its base and the motor screwed to the framework on the false top, as illustrated, by means of the guard braces. When an electric heating element is used in this unit, the metal heat spreader can be eliminated and the bottom of the cabinet can be made from the same material as the rest of the dehydrater. A porcelain socket is screwed to the bottom over sheet asbestos or some similar fireproof material to prevent scorching of the wood by the radiant heat. Likewise, a canopy of similar material—or a cover from a tin can will serve—must be placed over the top of the element to prevent scorching of the product on the lower tray. Since no thermostat is used in this unit, control of the temperature is achieved by an increase or a decrease of the incoming air by varying of the number of fresh-air apertures.

The accompanying table gives a list of the materials required. The cost as figured is the maximum. In many instances the cost of the items will not approach the listed cost, and considerable saving can be effected by the use of crate lumber and other materials usually available.

There is ample material (plywood, strips, etc.) in the quantities listed for the natural-draft dehydrater to take care of the increased size of the forced-air unit. The cost of the fan is not included in the estimate.

Part II of this article will be published in FOOD INDUSTRIES *for June, 1943, and will discuss preparation of vegetables for dehydration, operation of the dehydrater and cost of dehydration. It will also give construction details of a slightly larger dehydrater.*

References

Adams, Horner and Stanworth, The Effect of Blanching upon Vegetable Nutrients, *Nutrition Review*, vol. 1, 3, 69; *Journal of the Society for Chemical Industry*, vol. 61, 96, 1943.

K. E. Benson, A Cost Analysis of Home Canning, etc., Master's Thesis, Massachusetts State College, 33 pp., 1939.

Bureau of Home Economics, Foods and Nutrition Div., Drying Foods for Victory Meals, U.S.D.A. Farmers' Bulletin No. 1918. Washington, D. C., 14 pp., 1942.

E. M. Chace, W. A. Noel, and V. A. Pease, Preservation of Fruits and Vegetables by Commercial Dehydration, U.S.D.A. Circular No. 619, Washington, D. C., 1941.

W. V. Cruess and E. M. Mrak, The Dehydration of Vegetables, University of California Agricultural Experiment Station, Berkeley, Calif., 34 pp. (mimeographed pamphlet), 1941.

C. C. Eidt, Principles and Methods Involved in Dehydration of Apples, Dominion of Canada, Department of Agriculture Publication 625, Technical Bulletin 18, 36 pp., 1938.

C. A. Magoon and C. W. Culpepper, Scalding of Vegetables for Canning, U.S.D.A. Bulletin 1625, Washington, D. C., 48 pp., 1924.

A. F. Morgan and D. Lackey, The Effect of Various Methods of Preservation on the Vitamin D. Content of Spinach, University of California Household Science Laboratory (mimeographed report), 1934.

D. K. Tressler, Nutritive Value of Dried and Dehydrated Fruits and Vegetables, New York State Agricultural Experiment Station Technical Bulletin No. 262, Geneva, N. Y. 48 pp., 1942.

Army Specifications For Dehydrated Foods

Tentative specifications for dehydrated foods for Army use have been issued by the Quartermaster Corps. The Army requirements for various dehydrated products have been published in previous issues, and specifications for other products are given here

ARMY specifications for dried eggs, published in FOOD INDUSTRIES March, 1943, page 52, were superseded by new specifications on March 4, after the issue went to press. The text of the new Army release is printed here in its entirety, followed by specifications for other dehydrated products.

Dried Eggs

The following specifications, of the issue in effect on date of invitation for bids, shall form a part of this specification:

U. S. Army Tentative Specification No. 22–42, "Supplies, Subsistence, for the United States Army, Conditions Governing the Purchase of."

Quartermaster Corps Tentative Specification, OQMG No. 12-A, "Packing for Overseas Shipments."

"Quartermaster Corps Tentative Specification, OQMG No. 93, Boxes, Fiberboard, Corrugated and Solid."

Quartermaster Corps Tentative Specification, OQMG No. 94, Specifications, for Marking of Outside Shipping Containers by Contractors."

Types, Classes and Grades

Eggs, dried, shall be hens' eggs of domestic production and manufacture, and shall be of the following types as may be specified in the invitation for bids: Type I—Dried whole eggs. Type II—Dried egg whites (albumen). Type III—Dried egg yolks.

Dried eggs shall be of the following classes: (a) Spray dried; (b) pan dried; (c) drum dried. They shall meet all the requirements of this specification and be of highest quality for the respective type.

Material

All dried egg products shall be prepared from shell eggs or frozen eggs. If prepared directly from shell eggs, such shell eggs shall be candled within 48 hours before breaking. Any unsound or unfit eggs revealed by candling shall be discarded and any remaining unsound or unfit eggs shall be discarded after breaking.

Dirty, current-receipt eggs shall be washed and dried, and the temperature of the wash water shall exceed the internal temperature of the eggs. The wash water shall at no time exceed 100 deg. F. The eggs, after washing, shall be subjected to a solution of suitable bactericidal material and immediately thereafter be broken for drying or freezing.

If frozen eggs are used, the plant shall be equipped with sanitary facilities designed to render the frozen eggs into a flowable form within ten minutes, without raising the average temperature of the thawed eggs in excess of 45 deg. F. Frozen eggs shall have been prepared under conditions complying with those sections of this specification relating to type of shell egg, conditions of storage, washing and breaking. The aerobic count of properly drilled samples of frozen eggs shall not exceed 500,000 bacteria per gram when incubated on standard nutrient agar at 37 deg. C. for 48 hours.

"Tray drip" shall not be used.

Workmanship

All processes and operations in the preparation of dried egg products shall be carried out under strictly sanitary conditions. All shell eggs shall be candled, and any other operation substantially equivalent thereto shall be permissible, except that "Flashing" shall not be permitted. The temperature of liquid eggs shall at no time exceed 45 deg. F. prior to entering the drier. Where liquid eggs are stored in tanks for night drying operations the temperature of such liquid eggs shall not exceed 40 deg. F. after one hour from the time that the eggs are emptied into the tank, nor shall the storage time exceed 19 hours.

General Requirements

All deliveries shall conform, in every respect, to the provisions of the Federal Food, Drug and Cosmetic Act and regulations promulgated thereunder. Buildings and equipment used in the manufacture, processing, storage or handling of dried eggs shall be maintained in a strictly clean, sanitary condition. No person or persons affected with an infectious, contagious or communicable disease shall be permitted to work in or about the building in which the eggs are handled or processed. The finished product shall be free from glass, metal or wood splinters, and practically free from paper, or other foreign matter.

Before packaging, dried whole eggs and dried yolk shall be sifted, but not forced, through a screen not coarser than the size opening of a No. 16 U. S. Bureau of Standards Sieve (0.0468 in.). There shall be no grinding before or after sifting. Brush-type sifting reels shall not be used.

Detail Requirements

Type I, Class A. Spray-dried whole eggs—Dried whole eggs shall be manufactured by the spray process where the outlet temperature of the drier shall not exceed 145 deg. F. Except for egg-powder drying operations during the months of November, December and January, not more than 50 percent of the liquid eggs used at any one time shall be derived from frozen eggs. The "collector powder" shall be continuously and uniformly mixed with the regular drier powder. The temperature of the dried eggs coming out of the dryer shall be quickly brought to a temperature not exceeding 80 deg. F. The finished product shall comply with all of the following requirements within 72 hours from the time that it is removed from the drier, except that microorganism counts may be waived in not more than two samples (representing two lots) in any two-week production period.

Moisture—Shall not exceed 5 percent. Fat—Shall be not less than 40 percent as determined by the acid hydrolysis method. Standard bacterial plate count—(a) Shall not exceed 150,000 per gram. The plating medium shall be standard nutrient agar and the plates shall be incubated at 37 deg. C. for 48 hours. (b) Coliform organisms shall not exceed 100 per gram when examined under methods prescribed in the "Standard Methods for Examination of Dairy Products," American Public Health Association, 1941. (c) Yeast and mold count shall not exceed 100 cells per gram, respectively, when incubated on potato dextrose agar at 32 deg. C. for 48 hours. Texture—Shall be smooth and free from lumps that do not readily fall apart under light pressure. Reconstitution—Shall be readily and quickly reconstituted with cold water, and shall produce a smooth mixture simulating liquid egg consistency. Odor and flavor—Shall be free from any off-odors and off-flavors both in the dried form and when reconstituted.

Type II, Classes A, B, C. Dried egg whites (albumen)—The albumen delivered shall be clean and free from contamination and from adulterants or preservatives, but it may contain harmless processing materials used in commercial practice to improve functional qualities. The albumen shall be in either powder, flake or granular form as may be specified in the invitation for bids. Deliveries of flake shall not contain more than 20 percent of granular or powdered albumen. The dried product shall meet the following requirements.

Moisture—Shall not exceed: 8 percent for spray-dried albumen; 12 percent for powdered, pan-dried albumen; 14 percent for flake or granular albumen.

Odor and flavor—Shall have a sweet wholesome egg white odor and flavor, both

(Turn to page 120)

Preserving Fruits With SO_2 To Aid Lend-Lease Program

By J. G. WOODROOF and S. R. CECIL,
Georgia Agricultural Experiment Station, Experiment, Ga.

PART I*—Fruits to be sent to Britain for use in preserves can be treated with sulphur dioxide solution with a saving of critical materials. How the fruit is preserved with SO_2 is discussed here

NOT only is sulphur dioxide in water solution an efficient and economical preservative for peaches, strawberries, youngberries, blackberries and other fruits and fruit pulps, but SO_2 preservation requires no critical materials either in processing or as containers.

The objections to the use of sulphur dioxide treated fruits for domestic manufacture of jams, preserves and marmalades are the ease with which damaged or inferior products can be preserved and passed on to unsuspecting consumers and the difficulty in removing the preservative before the food is consumed. By rigid inspection at the point of packing and of the final products, both of these objections may be overcome.

The removal of sulphur dioxide from the product in preparation for consumption is difficult, but it can be accomplished by proper processing. In these tests the preservative was reduced from 2,200 p.p.m. to 200 p.p.m. by boiling in a steam-jacketed kettle for 20 minutes, boiling in a covered pan for 45 to 60 minutes or in an open pan for 60 to 120 minutes.

Use of SO_2 Limited

Use of sulphur dioxide dissolved in water has been limited in the United States to cherries for maraschino and for fruit salads; watermelon rinds for preserves, pickles and fruit cakes; the pulp of peaches and other fruits for wines, brandies and other fermented products; and treating fruits preparatory to dehydration.

Under license from the Secretary of Agriculture, a permit[1] to pack cherries refers to "the product made from fresh cherries . . . packed in and covered at all times with a solution consisting of sulphur dioxide gas in water, of sufficient strength to preserve and bleach the cherries, with the addition of a small amount of hydrated lime or other harmless hardening agent."

The English people use jams, preserves and marmalades made from sulphur dioxide treated fruits. At least 250,000 barrels of such fruits, mainly citrus pulp, strawberries, peaches and raspberries, have been packed in America for shipment to Britain under the Lend-Lease program.

This study was undertaken to evaluate the method as compared with other methods being used in America, and to collect data which may be of value to the British food program. Experimental work comprised two parts, a study of the method of preservation of the fruit in sulphur dioxide solution, and a study of the characteristics of jams and marmalades made from such fruit.

Preparation of Samples

All of the experimental fruits were graded; freed of foreign matter such as stems, caps, peel or pits; washed and drained. The prepared fruits were placed directly into the containers and the SO_2 solution was added, with or without firming agents. In these experiments the containers were glass jars of several sizes, or wooden kegs, and some half-barrels and whole barrels.

The initial preparation of peaches for preservation by sulphur dioxide solution is similar to that for canning. For the experimental packs all peaches were halved and pitted. Samples were peeled by hand or with lye solution. The peeled halves were run into a large vat and heated to 200 deg. F. with live steam. The steam was introduced through curved pipes at the bottom so the peaches were continuously and thoroughly agitated. Heating inactivates the enzymes that would alter the flavor of the stored peaches and stabilizes the small amounts of

A chemist from the Agricultural Marketing Service inspects the contents of each barrel of strawberries packed for Lend-Lease. Tests are made within 24 hours of the time the berries are packed.

* This article is based on a report published by the Georgia Agricultural Experiment Station as Paper 106, Journal Series; the project was sponsored jointly by the Commerce Department of the Tennessee Valley Authority and the Georgia Experiment Station.

pectin which they contain. The peaches, which become soft and lose juice during the heating and stirring, were run immediately into clean oak barrels and the proper amount of 2 percent sulphur dioxide solution was added while they were still hot. This was added in three portions at different levels in the barrel, so as to assure more even distribution of the preservative.

The method of preserving and utilizing youngberries and blackberries is similar to that for strawberries.

Strawberries packed in sulphur dioxide during 1942 were field capped immediately after picking or were taken to special capping sheds to be capped. Picking should be done in the pink stage rather than after the berries have become soft ripe. Capped berries must be handled quickly, and packing should be completed within 12 hours after picking, preferably within six or eight hours.

From 1,800 to 2,200 p.p.m. of sulphur dioxide is added to the barrels. Chemical and biological tests showed that as little as 250 p.p.m. will insure against fermentation and that 50 minutes of boiling may be required to reduce the concentration from 2,200 to 250 p.p.m. Thus it seems that with good cooperage and reasonable care in processing and handling there should be no loss of product when preserved in barrels with sulphur dioxide.

Strawberries are bleached to a cream color within an hour after being in contact with sulphur dioxide solution, and they remain this color until the gas is lost or driven off by heat. There is no danger of spoilage as long as the berries and juice remain bleached. Upon the loss of preservative, as indicated by the return of color, fermentation will proceed as in fresh berries.

In the manufacture of marmalades and jams it is desirable that the strawberries remain as firm as possible. For this reason, a very small amount of a calcium salt is added with the solution of sulphur dioxide. The calcium combines with the pectin of the middle lamella of the cell walls to form insoluble calcium pectate.

In experimental packs, calcium salts for firming were dissolved in the sulphur dioxide solution or the dry salts were sprinkled over the berries in the containers and the sulphur dioxide solution was poured over them. The salts used were the carbonate, chloride, sulphate, oxide and the monocalcium phosphate. Calcium hydroxide was also used for strawberries. The salts were added in amounts to make a concentration of about 0.2 percent calcium by weight. For one series of tests, strawberries and youngberries were treated with calcium salts in water for 30 minutes, and then this solution was drained off before the sulphur dioxide was added. This did not give adequate firming.

Mixing

The preservative penetrates rapidly enough to "preserve" the fruit properly within one day, and if a perfect mix were obtained when the barrel was filled, subsequent rolling would not be necessary. A perfect mix is not obtained with the mushy fruits such as peaches, and several turnings are necessary to prevent the onset of fermentation in localized spots.

Mixing is assured by rolling each barrel several turns immediately after packing and rolling a half-turn daily for several days thereafter. Rolling also prevents the upper side of a barrel from becoming dry and subsequently leaking. Periodic inspections to determine that the sulphur dioxide concentration remains sufficient to preserve the fruit, and rollings to assure that the fruit and gas are kept properly mixed, are all that are necessary to prevent losses from fermentation or mold.

Several test jars of peaches were packed with 1,500 p.p.m. of sulphur dioxide. The samples were not agitated after the initial mixing. Two weeks later, in most cases, the top layer was only partially submerged, and tested from 20 to 50 percent below the concentration required to preserve the fruit. The bottom layers contained within 100 p.p.m. of the original concentration of sulphur dioxide.

Bleaching Action

All of the natural colors in fruits are changed in the presence of sulphur dioxide. The caratenoid yellow color of peaches seems to be affected least. In general the red pigments, anthocyans, are reduced to pale yellow while chlorophyll is reduced to a lighter shade. The pigments which develop during the process of ripening seem to be attacked most vigorously. Undercolored strawberries and peaches bleach less and are preserved with more coloration than fully ripe and much more highly colored fruits. Youngberries bleach to the pinkish color of the immature fruit. Not all varieties of a fruit bleach an equal amount. Some strawberries bleach to a light pink color, while others develop a pale yellow color. The rate of bleaching may be used as an indication of the rate of penetration of sulphur dioxide into the fruit.

The presence of calcium salts influences the rate and amount of bleaching. Within the first 30 minutes after treating, those fruits in solutions containing calcium chloride were bleached most, and those with calcium carbonate or oxide were bleached least.

Calcium chloride seemed to brighten the red colors, calcium sulphate seemed to dull them, and calcium oxide gave a greenish color to the finished cooked product.

On cooking, up to 80 to 90 percent of the original color returns, and in many cases the cooked product cannot be distinguished in color from that made from fresh fruits.

Rate of Penetration

The fruits were considered to be saturated when the sulphur dioxide content of the fruit tissue reached the same concentration as that of the liquid medium.

For youngberries the sulphur dioxide solution alone required 20 hours for complete penetration, or saturation. Calcium sulphate reduced the time to 6½ hours, phosphate required about 19½ hours, the oxide 163 hours and the carbonate more than 200 hours.

The concentration at which the berries contained a maximum of sulphur dioxide with relation to that in the juice varied with each salt used. Berries in sulphur dioxide solution alone approached this maximum at 1,825 p.p.m., with calcium carbonate added the maximum was approached at about 2,400 p.p.m.; with the sulphate it was reached at 2,775 p.p.m.; with the phosphate, at 3,000 p.p.m.; and with the oxide, at 3,700 p.p.m.

This wide variation was probably due to a greater loss of sulphur dioxide gas from those containers to which were added the salts giving greater retardation of penetration. The fact that with calcium oxide, phosphate or carbonate the concentration of sulphur dioxide in the berries ultimately increased beyond the concentration of the juice was probably due to this relatively greater loss of gas to the atmosphere from the juice.

The strawberries used in these tests were very ripe, and penetration in all cases approached 100 percent within 24 hours. The rate of penetration with sulphur dioxide alone and with four of the other five solutions was greatly reduced after 10 hours, while that with calcium carbonate added continued at almost the same rate for a greater time, reaching 100 percent penetration in 23½ hours. Numerous observations of the rate of bleaching of strawberries, youngberries and peaches indicate that sulphur dioxide solution penetrates fully ripe fruit more rapidly than partially ripe or green fruit.

Strawberries and youngberries were carefully selected for uniform size, texture and degree of ripeness. After the berries had been packed for one month they were again graded for uniformity, and 30 berries from each lot were selected to be tested with a tenderometer for firmness. The tenderometer was a modified beam balance, adjusted so that the number of grams required to crush each berry to half its diameter could be recorded.

Fermentation of Preserved Fruits

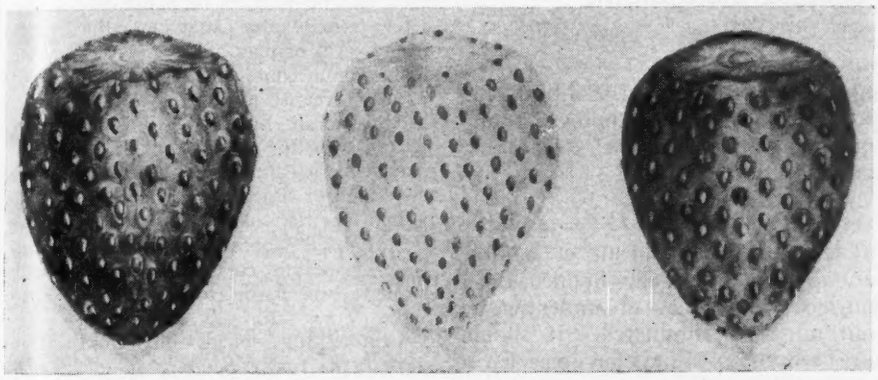
Several series of tests on the fermentation of sulphur dioxide treated fruits have been run. In one series samples of peach pulp containing 1,000 p.p.m. of sulphur dioxide were inoculated with yeast and set aside for three weeks. No fermentation occurred. Samples of the same pulp were heated to expel SO_2, so that the concentration was reduced to 600, 400, 200 and 100 p.p.m., respectively. Of these, only the 100-p.p.m. material fermented when inoculated with yeast. The sample with 200 p.p.m. also began to ferment after several days. Check tests showed that fermentation of this sample did not begin until the loss of gas had left a residual concentration of about 125 p.p.m.

Wide-mouth jars of strawberries containing 2,000 p.p.m. of sulphur dioxide and similar jars of Hale and Elberta peaches containing 1,600 p.p.m. were left open at room temperature. The strawberries fermented after 7 weeks, the Hale peaches molded after 8 weeks, and the Elberta peaches molded after 12 weeks. Fermentation began in the strawberries at about 125 p.p.m. of sulphur dioxide, while the peaches began to mold at about 200 p.p.m. The determinations represent the entire sample, and doubtless the areas first to spoil were somewhat lower in sulphur dioxide than the figures given. A barrel of similar peaches lay with the bung out for more than two months with no evidence of spoilage. If fermentation is initiated in any one place, it will spread rapidly and increase in intensity because the evolution of carbon dioxide gas quickly drives off the sulphur dioxide gas by "washing."

Salts for Firming

According to Atkinson and Strachan[2], fruits with which an effort is made to maintain the original shape—such as strawberries, cherries, raspberries and apples—are treated with calcium salts in addition to sulphur dioxide. Fruits with which no effort is made to maintain the original shape—such as blackberries, damsons, gooseberries, loganberries, peaches, prunes and apricots—are treated with sulphur dioxide alone. The sulphur dioxide solution, when allowed to act alone, causes immediate release of the juices, with subsequent softening which finally results in complete loss of structure in the case of most fruits. The calcium combines with the pectin in the cell walls to form insoluble calcium pectate.

Among the salts tested for firming strawberries, calcium carbonate, which is customarily used, proved the most satisfactory. Calcium oxide tended to leave the berries objectionably gray in color, and calcium chloride was a poor firming agent. All of the youngberries were firmer than similarly treated strawberries, and it was concluded from the tests in jam making that youngberries remain sufficiently firm without use of calcium salts.



Decolorizing effect of the sulphur dioxide solution is shown in the case of a Blakemore strawberry. At the left is the fully ripe fruit, in the center the same berry after sulphur dioxide treatment and on the right it is shown after the gas has been driven off with heat.

Method and Rate of Removal of Preservative

The most difficult step in utilizing fruits treated with sulphur dioxide solution is the removal of the preservative. If more than 70 p.p.m. remains, the product is considered unpalatable. Boiling vigorously in a steam-jacketed kettle is the most satisfactory way of eliminating SO_2, but frequently the necessary amount of cooking interferes with the normal procedure in jam and marmalade making. Large quantities of water must be added to prolong the cooking sufficiently for complete removal of the preservative without undue softening of the fruit. This water should be added in small quantities so as to maintain an even flow of steam from the surface.

Approximately 400 batches of preserves from sulphur dioxide treated fruits were made by cooking on an open gas stove. In every case, removal of dissolved sulphur dioxide was much more rapid when the vessels were covered. The rate and completeness of sulphur dioxide removal did not vary widely between peaches and strawberries, but in youngberries the final concentration after two hours was greater than with the other two. The addition of sugar to the fruit reduced the original concentration of sulphur dioxide, but the rate of removal on boiling was the same as if sugar had not been added. Hale peaches lost the preservative at almost the same rate as did Elberta peaches, although the two varieties differ widely in texture and tendency to "cook-to-pieces."

Loss of sulphur dioxide gas from fruit in a covered vessel is more rapid because the presence of a constant atmosphere of steam over the surface of the product prevents condensation of the vapor before it escapes from the vessel.

With a steam-jacketed aluminum kettle the time required for adequate removal of the preservative was reduced to 30 to 45 minutes, as contrasted with 2 hours for removal by cooking on an open stove. The reduction in time was due to the even distribution of heat over the entire cooking surface. Batches of preserves cooked in steam-jacketed copper kettles were much darker than those cooked in the aluminum kettle, because of the action of the sulphur dioxide solution on the copper.

Part II of this article, dealing with the use of sulphur dioxide fruits in jam making, will be published in June. —The Editors.

References

1. Regulations for Warehousemen Storing Cherries in Sulphur Dioxide Brine, U. S. Department of Agriculture, Bureau of Agricultural Economics, No. 134, 1932.

2. F. E. Atkinson & C. C. Strachan, Preservation of Fruits with Sulphur Dioxide in British Columbia, *Fruit Products Journal*, vol. 21, pages 5, 43, 72, 110 and 141, 1941-1942.

Concentrating Citrus Juices By the Vacuum Method

By J. L. HEID, Senior Chemist, Agricultural Chemical Research Division, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

PART I* — Selection of fruit, the equipment used and processing are described in the first part of this article. Control, sanitation, packing and costs are to be discussed in the second instalment.

THE juice of oranges, grapefruit, lemons and limes can be concentrated to as little as one-tenth of the original volume by evaporation of water under high vacuum. Concentrates, protected from contact with air in waxed barrels or in tinplate or glass containers, can be held at 32 deg. F. for as long as two years.

These concentrates are used in carbonated beverages and confections, or they may be reconstituted to the original volume for consumption. Concentrates containing the juice solids from as much as four tons of fruit may be stored and shipped in a 50-gal. barrel, an important consideration when containers are scarce or shipping facilities are inadequate.

In order to minimize impairment of flavor, color and food value, every detail of preparation, packing and handling must be controlled. This paper describes methods suitable for production of citrus concentrates on a commercial scale.

Equipment

Stainless steel, glass, glass-enameled ("glass-lined") steel, oil-resistant rubber, stainless aluminum alloy or similar inert materials should be used for equipment coming in contact with juice or concentrates.

Stainless steel (18-8) alloy is widely used for tubing, tanks, valves, fittings and pumps. For lemon and lime concentrates, stainless steel with 1 to 4 percent of molybdenum is preferred. Some acid-resisting stainless alloys also contain less than 1 percent of columbium.

Surfaces of equipment coming in contact with the juice should be smooth and free from crevices to facilitate cleaning and avoid the hazard of introducing spoilage organisms. Approved dairy equipment is well adapted to cleaning and inspection.

Selecting Fruit

Clean, sound, ripe fruit of suitable varieties should be used. Spoiled, frost-damaged, and over- or under-mature fruit must be eliminated. It should also be borne in mind that juice flavor is affected by the location and management of groves. Only juice of excellent flavor should be used for concentrates. Scales for weighing fruit on trucks or conveyors at the concentrating plant are necessary for the determination of fruit costs and juice yields.

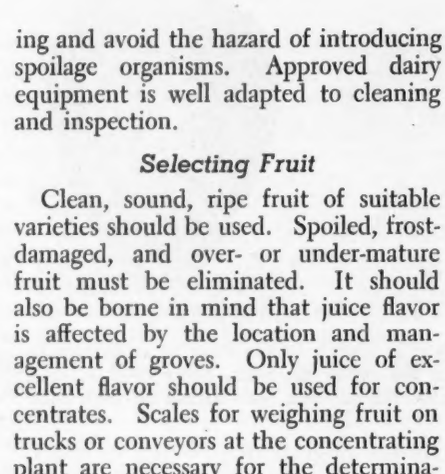


FIG. 1. Flash pasteurizer for flash heating of citrus juice. This is a high-velocity heat exchanger, effective for killing yeasts and inactivating pectin enzymes.

Oranges—Juice yields vary from 70 to 105 gal. per ton. Valencias are generally preferred for flavor, color, and stability. Navel orange concentrate may deteriorate in color and flavor unless fully ripe fruit is used and the juice is flash-pasteurized within a few seconds after extraction. Juice yields from Navel oranges are low. However, the high vitamin content of this variety has led to extensive use in recent years. Temple, Mediterranean, Florida Seedling and Early Round varieties are also used, but Mandarin varieties are not.

Grapefruit—Juice yields vary from 70 to 90 gal. per ton. Marsh and Duncan varieties are used. Because of its neutral character, grapefruit concentrate is used with stronger fruit flavors to balance fruit character.

Lemons—Juice yields vary from 70 to 95 gal. per ton, depending upon the ripeness of the fruit and whether it has been harvested tree-ripe or "cured" in cool storage. Eureka and Lisbon varieties are preferred. Lemon juice concentrated to 30 percent citric acid content is finding a wide market as a superior substitute for citric acid in beverage manufacture.

Limes—Juice yields vary from 60 to 90 gal. per ton. West Indian, Baers' Seedless, Persian and other varieties may be used.

Extracting the Juice

After adequate washing and sorting of fruit, the juice can be extracted by reaming or pressing, or a combination of these methods. Simple, rugged extractors should be designed to avoid grinding action which may incorporate excessive pectin, and cause jelling of concentrates. If juice is pressed from unpeeled fruit, the oil may be substantially separated by passing the juice through a high-speed centrifuge. Oil remaining in the juice is largely volatilized during concentration.

Screening

Seeds and membrane are separated from the juice in tumbling screens or in cyclone finishers with perforated screens having 0.020-in. openings.

Deaerating

Removal of 90 percent of entrapped air by agitation of juice under a 29-in. vacuum has been observed to improve vitamin C retention by approximately

* Agricultural Chemical Research Division Contribution No. 97.

10 percent. Deaerators of high capacity and efficiency are commercially available.

Pasteurizing

Flash-heating the juice without delay in a high-velocity heat exchanger to 200 deg. F. is effective for killing yeasts and inactivating pectin enzymes. Damage to flavor may be minimized in pasteurizers where uniform juice velocities greater than 8 ft. per second, and heat transfer rates as high as 300 b.t.u. per hour per square foot, per degree difference in temperature[1, 2] are maintained.

Pasteurizers with high heat-exchange rates are designed either with small, flattened or coiled tubes, or tubes containing continuous helical baffles to agitate the juice. In plate-type exchangers, the juice and heating medium flow between plates separated by only a small fraction of an inch.

If steam is used for heating, the juice should be directed upward and the steam and condensate downward through restricted channels to secure uniform counterflow heat exchange, which improves efficiency and facilitates control.

In high-velocity heat exchangers of the coiled flattened-tube type, it is possible to heat grapefruit juice under pressure to temperatures as high as 240 deg. F. with less change in flavor than is caused by heating to 180 deg. F. in low-velocity heat exchangers with tubes of large diameter.

If juice is heated rapidly to 205 deg. F. in an exchanger of suitable design and immediately cooled either by introduction into a vacuum chamber or by passage through a water-jacketed cooling tube, undesirable changes in flavor can be largely avoided.

Buffering

The equivalent of 200 parts per million of sodium citrate or sodium bisulphite is sometimes added to pasteurized juice accumulated for concentrating. Sulphurous acid aids in retarding oxidation and the development of spoilage organisms. Uncombined sulphur dioxide is substantially removed during concentration under vacuum.

Residual sodium citrate aids in inhibiting jelling of concentrates containing acid, pectin and 65 percent or more of soluble solids.

At one time, many concentrators added sugar to citrus juices before concentrating; but this practice has been discontinued except for certain special products.

Traces of sodium chloride are sometimes added to orange concentrates to modify the taste.

Concentrating

Vacuum concentration is accomplished by evaporating water and other volatile constituents in vacuum pans which vary in methods of supplying heat, condensing vapors and producing a vacuum.

Although multiple-effect evaporators permit savings in fuel, single-effect equipment has been more commonly employed to facilitate close control at low temperatures and avoid overcooking.

A simple design is the *jacketed pan*, consisting of a cylindrical vessel, the bottom portion of which is surrounded by a steam jacket. Accurate thermometers, vacuum gauges and level indicators make it possible for skilled operators to produce concentrates of good quality in batch operation, provided the level of juice and concentrate is always maintained above the top of the steam jacket. If a vacuum is maintained equivalent to 29 in. of mercury, temperatures in excess of 115 deg. F. can be avoided.

A tight-closing manhole is necessary in this and other vacuum pans to permit thorough cleaning. The evaporative capacity of the jacketed pan is limited because of the small heat-exchange surface.

Pans with internal heaters of flattened coil or vertical tube Claassen type have more heat-exhange surface and correspondingly increased evaporative capacity. A central downtake is standard, and circulation is induced by convection.

These so-called "calandria" pans have a higher capacity than jacketed pans but some difficulty may be experienced with viscous concentrates.

Circulating evaporators with external steam chambers containing vertical heating tubes of small diameter are most widely used for large citrus juice concentrating operations. Designs of such evaporators vary. Circulation may be obtained by convection, but positive control by means of high-speed centrifugal pumps is generally preferred.

The circulating pump is located below the flash chamber to force the juice upward through the outside heating element. An outlet valve and butterfly choke valve in the line between the pump and heater make it possible to remove the concentrate without breaking the vacuum and thus permit continuous operation. Single-strength juice is admitted at the bottom of the heating element, and when the juice has reached the desired degree of concentration it can be pumped out without suspending operation.

Thermometers, located just above the heater and in the juice at the bottom of the flash chamber, permit the operator to observe maximum and minimum temperatures and maintain a constant differential of from 5 to 10 deg. Juice entering the flash chamber from the heater is directed downward, tangentially to the wall, to avoid entrainment losses.

Heat is supplied by admitting steam, at pressures ranging from 1 to 10 lb. per square inch, to the chest surrounding the vertical-tube heat exchanger. Steam from plant lines maintained at higher pressures may first be used to operate turbine-driven pumps or other equipment, provided the steam requirement of the turbine is less than that of the evaporator. Under this condition, the turbine operates efficiently, discharging into the partial vacuum maintained by pumping condensate from the heat exchanger. Small quantities of additional steam can be admitted to the heater through a reducing valve. When the steam requirement of the turbine exceeds that of the heater, it is necessary to discharge a portion of the steam to atmosphere, necessitating excessive back pressure upon the turbine and reducing its efficiency.

A swing check valve at the top of the steam chest vents steam when the steam pressure exceeds atmospheric but prevents the admission of air when the inside pressure is below atmospheric. A condensate pump at the bottom of the heater returns condensate to the boiler and may be used to maintain a reduced pressure in the steam chest, increasing turbine efficiency and permitting the control of temperatures below 212 deg. F.

There has been a trend toward higher vacuum and lower temperature, using equipment of high capacity designed to minimize the hazard of local overheating or scorching.

The necessity, however, of supplying cooling water 20 deg. lower in temperature than the vapor has imposed limitations upon practicable operating temperatures. In subtropical citrus sections, refrigeration is usually necessary to supply condensing water at temperatures below 70 deg. F.

Multiple-effect evaporators may be of the Claassen or of the outside heater type. Vapors from the first effect are drawn into the steam chest heater for the second effect, which thus serves as a surface condenser. When properly designed and operated, this type of equipment may permit substantial savings in fuel.

Condensing Vapors and Securing Vacuum

Vapors can be condensed and a vacuum obtained by several methods.

Abundant cool condensing water at nominal cost is necessary. *Surface condensers* are used only on small evaporators and in multiple-effect equipment. *Barometric countercurrent condensers*, and parallel-flow *water-jet condensers* are widely used.

Multiple-jet condensers are simple in design and operation. Cool water under pressure is projected downward through a ring of nozzles at the center of the condensing chamber, being aimed into the throat of the wet leg and dropping 35 ft. to a hot well.

Vapors from the evaporator are drawn into the top of the condensing chamber at high velocity. Steam is condensed, and noncondensables are carried down the leg by entrainment. The moderate cost of this equipment favors its use for small installations where abundant cooling water can be supplied at nominal cost. If the vapors contain appreciable quantities of uncondensable gases, this type of condenser is not adapted for maintaining the high vacuum now required.

Barometric condensers, with separate vacuum pumps for removing noncondensables, are used for most large juice evaporators. In equipment of this type, vapors from the concentrator enter the bottom of the condensing chamber. Condensing water enters near the top, and intimate mixture is insured by baffles. Condensing water and condensate drop through a 35-ft. barometric leg to a hot well, or if more convenient may be pumped out. Uncondensables are drawn from the top of the condenser by a vacuum pump which usually consists of a two- to four-stage steam-jet ejector system with inter-condensers between the stages. Dry steam at uniform pressure is necessary. With such a system it is possible to secure a vacuum permitting operation of evaporators at 80 deg. F., provided cooling water is supplied to the condenser at 50 deg. F.

When it is impossible to supply condensing water 30 deg. cooler than the desired pan operating temperatures, a one- or two-stage steam-jet vacuum booster may be inserted in the vapor stack. This increases requirements for condenser water and steam.

Other methods of condensing vapors and securing a vacuum are modifications of those described. The condenser may be located in the top of the flash chamber with resulting saving in initial costs.

As long as citrus concentrates were used almost exclusively as carbonated beverage bases, maximum temperatures of 115 deg. F. were considered satisfactory. Increasing interest in the production of concentrates to replace fresh and canned juice, and permit savings in containers and shipping facilities, makes it desirable to maintain maximum concentrating temperatures below 100 deg. F.

The effect of heat upon the flavor of citrus juices and concentrates depends upon both time and temperature. Prolonged heating and local overheating cause trouble more frequently than excessive temperatures. Equipment must be designed to insure rapid, uniform application of heat, agitation of juice in contact with heat-exchange surfaces, avoidance of drying upon heated surfaces, and quick cooling to temperatures below 100 deg. F.

Single-Pass Continuous Concentrating

Efforts have been made to design single-pass concentrators suitable for handling citrus juices without scorching. At 100 deg. F., the heat of liquid is only one-twentieth as great as the latent heat of evaporation. It is therefore impossible to supply sufficient heat to the juice before it enters the flash chamber to permit concentration from initial soluble solids of 10 percent to final soluble solids of 70 percent.

In order to supply heat continuously to the flowing mixture of juice and vapor without causing scorching, efforts have been made to use a heat-exchange medium at very low temperature and to use equipment designed to cause high speed, uniform flow over all heat-exchange surfaces. Because of the viscosity and susceptibility of citrus concentrates to scorching, difficulties must be overcome before commercial applications will be practicable.

Ester Recovery

Fractions of condensates containing flavoring esters, and so forth, are commonly returned to concentrates made from grape and apple juices. The resulting improvement in flavor justifies the cost. Efforts to return fractions of condensates to citrus juice concentrates have usually resulted in off-flavors which offset any improvement which might otherwise have been obtained through the presence of the flavoring constituents. However, it is not improbable that further research may develop methods for improving citrus concentrates by returning certain fractions of the early distillate.

Recovery of ester fractions is impos-

(*Turn to page* 122)

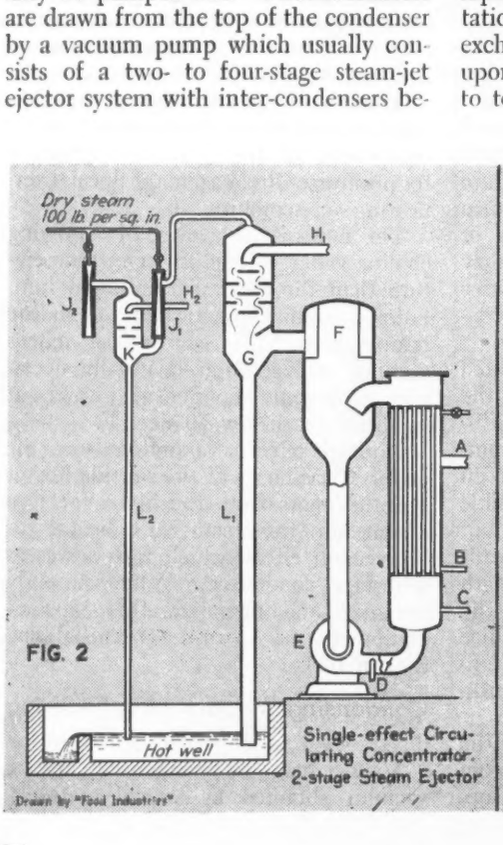


FIG. 2

FIG. 2. Single-effect, forced-circulation concentrator with a counterflow barometric condenser and a two-stage steam-jet evactor.

A, inlet for low-pressure steam. *B*, outlet for condensed steam. *C*, inlet for single-strength juice. *D*, outlet valve and tube for pumping out concentrate by choking the adjacent butterfly valve in the main circulating system. *E*, circulating pump. *F*, flash chamber equipped with a built-in spiral entrainment separator. *G*, counterflow barometric condenser. H_1 and H_2 condenser-water inlets. J_1 and J_2, first and second stages of steam-jet evaction. *K*, small barometric intercondenser. L_1, L_2, barometric legs with minimum length of 35 ft.

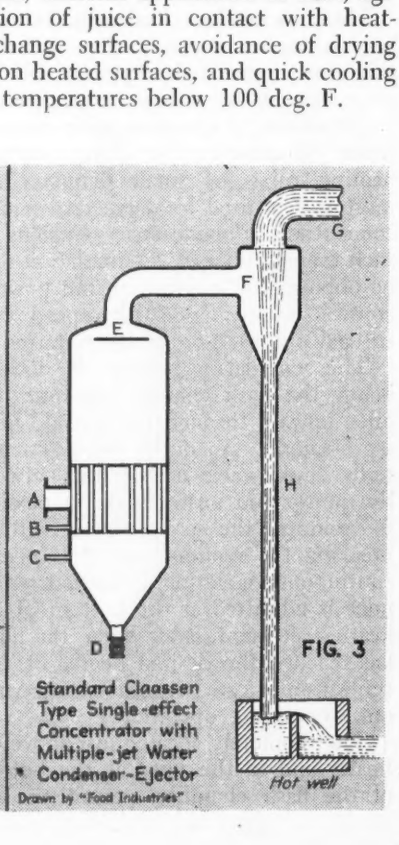


FIG. 3

FIG. 3. Standard Claassen type single-effect concentrator with multiple-jet condenser-ejector.

A, inlet for low-pressure steam. *B*, outlet for condensed steam. *C*, single-strength-juice inlet. *D* outlet for concentrate. *E*, stack equipped with a baffle to minimize entrainment. *F*, multiple water jet condenser. *G*, condenser water inlet. *H*, barometric leg with minimum length of 35 ft.

Research Shows How Vegetables Can Be Preserved by Brining*

By F. W. FABIAN, Michigan State College, East Lansing, Mich.

Preliminary tests made with corn, peas, green string beans, green lima beans and okra. This method of preservation has the wartime advantage of not requiring critical materials in either the processing or the packaging operations

THERE are four methods by which food may be conserved: Canning, freezing, dehydration and pickling. Of these, pickling is by far the oldest. There are references to cucumber pickles in literature dating back over 4,000 years. It would appear that the making of pickles originated in the East Indies and the secret of preserving them traveled throughout the Orient, to Persia, then to Egypt, Greece and Rome.

Pickling may be defined as the addition of chemicals in quantities sufficient to suppress spoilage bacteria, but which may or may not permit the growth of desirable microorganisms. These chemicals may be sodium chloride, sodium nitrite, sugar or organic acids such as acetic and lactic. It is possible to add a sufficient quantity of any one or a combination of the above chemicals to suppress completely all growth. In many cases this is undesirable and unnecessary since it entails a needless expense and may ruin the food.

Preserving Properties of Salt

There are several factors which influence the salt tolerance of microorganisms. Winslow and his students[1,2] have shown that a wide variety of metallic ions (sodium, potassium, calcium, magnesium, barium, lead and mercury) stimulate the growth of bacteria when present in a sufficiently low concentration and inhibit it in a sufficiently high concentration. This is a quantitative relationship and differs only in degree. A second factor is the pH of the solution, which, with a similar cation, is determined by the anion. In our work[3] with sodium chloride and acids, we found that the addition of acids (hydrochloric, acetic, citric, lactic, malic and tartaric) reduced by 50 percent the amount of sodium chloride necessary for germicidal action.

A second important factor is the previous habitat of the organism. When organisms that have been grown on a medium containing no salt are suddenly transferred to a medium containing a large amount of salt, practically all the cells die and there are no visible signs of growth. Microorganisms frequently can be made to grow in the same concentrations by repeated inoculations into successively higher concentrations of salt.[4]

Role of Salt in Pickles

Our work has shown that in the fermentation of cucumber pickles salt exerts a selective action on bacteria. The addition of salt to any of the fermented types of pickles discourages the growth of pectase-producing bacteria such as the mesentericus group and permits the acid-producing group to grow. The lower the salt concentration, the greater the growth of lactic acid bacteria, which soon produces sufficient acid to supplement the inhibitive action of salt. Thus, a combination of 1 percent acid plus 5 percent or more salt is equivalent to approximately twice the amount of salt. If it were not for salt-tolerant yeasts, such as Debaryomyces and Mycoderma, the pickle man's life would be a lot easier.

Onions, Cauliflower and Green Tomatoes

Green tomatoes can be salted in the same way as cucumbers. They usually come late in the fall when the weather is cold, so that about all that is necessary is to put them in a 40-deg. (salometer) brine and gradually raise the concentration to the point where they will not freeze. This means about 60- to 70-deg. sal. in the northern states.

For onions and cauliflower, sufficient salt must be added to prevent fermentation and inhibit the growth of all bacteria. Some prefer to add the salt all at once, while others prefer to change the brine several times, making each subsequent brine a little stronger. The final concentration should be 80 deg. sal. If onions and cauliflower are salted properly, they will be white and crisp. Usually it will be necessary to remove the outer layer of the onion skin before using.

All of these vegetables will process well, and vinegar, salt and sugar may be added to them without softening them.

The Brining of Cabbage

Salt plays an important part in preserving cabbage after it has been shredded. The work of Pederson[5] has demonstrated that when less than 2 to 2.5 percent or more than 3 percent of salt is added to the shredded cabbage, the resulting kraut is inferior. The bacteriology of kraut fermentation is somewhat better understood than are those of some of the other brine fermentations. There is a series of three fermentations, each following the other in sequence. Under the proper conditions of salt and temperature, the first stage of the fermentation is started by *Leuconostoc mesenteriodes*, whose optimum temperature for growth is 77 deg. F. The bacteria of this group reach their maximum number at the end of the first or second day. They ferment the sugar present in cabbage, changing it to lactic and acetic acids, ethyl and mannitol alcohols, and carbon dioxide. This group raises the acidity to about 1 percent.

The second group of bacteria, *Lactobacillus cucumeris*, whose optimum temperature is 86 deg. F., starts to grow rapidly at the end of the second day. These bacteria change the sugar into lactic acid, thereby increasing the acidity to 1.5 percent. By the end of the sixth day they have finished their work and a third group *Lactobacillus pentoaceticus*, has taken over. This group

* From a paper presented before the Chicago Section, Institute of Food Technologists, in November, 1942.

reaches its maximum growth by the end of the seventh day, at which time the acidity has increased to about 2.4 percent. This third group converts the rest of the sugar to lactic and acetic acids, ethyl an dmannitol alcohols and carbon dioxide. Under favorable conditions the cabbage has been changed to kraut within a period of one week, at the end of which time it may be canned and sold.

Experimental Brining Of Other Vegetables

In 1942, Diamond Crystal Salt Co. established an industrial fellowship at Michigan State College to study the possibility of brining vegetables as a wartime means of conserving them. It was thought that, in addition to use in home processing, brining offered some possibilities for institutions using large quantities of food and to manufacturers of soup. The fresh vegetables could be salted in barrels, casks or tanks as they ripened throughout the summer and fall, then in the winter and spring they could be freshened and used as needed.

Experiments on Peas

Alaskan No. 2 sieve peas were tested first. Later the experiments were repeated with No. 3 sieve sweet peas. To determine just what strength brine was necessary to prevent fermentation and spoilage, 25-lb. batches, blanched and unblanched, were salted in brines varying by intervals of 10 deg. from 30 to 90 deg. sal.

In 30 deg. sal. brine the peas spoiled in about five weeks and had maximum bacterial count of 600 million acid bacteria per cubic centimeter within four days. The peas in 40-deg. brine kept about two months, with the acid-producing bacteria reaching a peak of 300 million within a seven-day period. The peas in 50-deg. brine kept about three and one-half months and those in 60-deg. brine kept about four months. Those in 70-, 80- and 90-deg. brines were still good when this report was prepared. The bacterial counts in the high-test brines are sufficiently low to indicate that they will keep.

When peas were put in 40-deg. brine for two days, after which sufficient salt was added to bring the brine to 80 deg. sal., the blanched peas developed an off-odor and spoiled within three and one-half months (the same length of time as those in 50-deg. brine), while unblanched peas were still good and had a low bacterial count.

Sweet peas were salted by the salting procedure used for cucumbers. They were placed in 40-deg. brine, raised 2 deg. per week until it tested 50 deg., then 1 deg. per week until 60 deg. was reached. These sweet peas spoiled within nine weeks, when the brine had reached 55 deg. sal. It is obvious that this method cannot be employed. Peas salted in 80-deg. brine were still good and had a low bacterial count after four months.

The peas that fermented lost some of their color, but those preserved in the higher brines where there has been little or no fermentation have an excellent color, superior to canned peas.

Addition of Sulphur Dioxide

In experiments using various brine concentrations to which had been added sulphur dioxide (potassium metabisulfite) ranging from 500 to 3000 p.p.m. available SO_2, at 500 p.p.m. intervals, it was found that the sulphur dioxide inhibited microbial growth for varying lengths of time depending upon the concentration used, but that it could not be depended upon as a preserving agent even at a concentration of 3,000 p.p.m. for a period longer than two weeks. The 500-p.p.m. sulphur dioxide preserved for about two days and other concentrations for periods ranging between two days and two weeks.

One of the significant facts developed was that the higher the salt concentration, the more effective was sulphur dioxide. For example, when 3,000 p.p.m. of SO_2 was added to 20-, 30-, and 40-deg. sal. brines, the bacterial counts at the end of two days were 10,000,000, 33,000 and 30,000 organisms, respectively, while at the end of seven days the counts were 80,000,000, 7,000,000 and 160,000, respectively. This shows that while SO_2 had some initial influence in reducing the count, over a long period of time it was the salt that exerted the preserving action rather than the SO_2.

Peas in 20-, 30-, and 40-deg. brines without any sulphur dioxide showed bacterial counts within two days of 62,000,000, 44,000,000 and 180,000, respectively, and at the end of seven days 375,000,000, 240,000,000 and 14,000,000, respectively.

Corn

The experiments with peas had demonstrated that the lower brine concentrations were useless, so for whole-kernel corn, 40-, 60- and 80-deg. sal. brines were used. The 40-deg. brine was raised 2 deg. per week until it reached 50 deg. sal. and 1 deg. per week until the brine tested 60 deg. sal. The 60- and 80-deg. sal. brines were kept at these concentrations throughout. Corn was tested both with and without preheating.

Fermentation took place in both the 40- and 60-deg. brines, and very slowly in the 80-deg. brine. No spoilage occurred in any of the crocks of corn. The physical appearance of the corn was good, but the brine started to become milky within two or three days after salting.

String Beans

The string beans used for the salting were of the Refugee variety. They were tested blanched and unblanched, whole and cut. The same salting procedures were used as for corn. Those that were salted in low brine concentrations underwent a comparatively slow fermentation with the production of over 1 percent acid, while those in the high salt brines developed around 0.5 percent acid. There was no spoilage or off-flavors in any of the brines.

The physical appearance of the cut beans was better than that of the whole string beans. Those that fermented lost more color than the unfermented ones. On the whole, the appearance of the fermented ones was equal to that of the canned product, and in the case of those preserved in high salt brines the color was superior to the canned product.

Green Lima Beans

The same procedure was also used for salting the blanched and unblanched green lima beans. All the lima beans that were salted at 40-deg. sal. initial concentration and the brine raised 2 deg. per week had spoiled by the time the concentration had reached 50 deg.

The unblanched lima beans spoiled in the 60-deg. brine, but the ones that had been blanched were good. All those that were salted in 80-deg. brine were still good and had fermented only very slightly.

The physical appearance of those that had undergone fermentation was not as good as the unfermented ones. Fermentation makes them light in color, but does not harm their texture.

Okra

Okra was put down in 40-deg. and 80-deg. brines. The 40-deg. brine was raised 2 deg. per week. None of the samples had spoiled up to the time of this report, when the brine tested 51 deg. salometer. Okra placed in this less concentrated brine fermented slowly, while that at 80-deg. showed

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How To Produce Frozen Eggs That the Housewife Can Use*

By P. J. SCHAIBLE and C. G. CARD
Chemistry Section and Poultry Section, Michigan Agricultural Experiment Station, East Lansing, Mich.

While frozen eggs have several advantages over shell eggs, they have never been produced in a form suitable for use in the home. But here is a method for producing and packaging frozen whole eggs, whites and yolks suitable for distribution in retail outlets and convenient for kitchen use

FROZEN eggs are easier to handle than shell eggs, are more uniform, keep better, require less storage space and save time by eliminating the task of breaking and separating. For these reasons they are preferred by food manufacturers for use in bakery products, candy, noodles, ice cream and mayonnaise and other salad dressings.

Despite these advantages, frozen eggs have not been made available for use in the home, even though the many retail outlets for frozen foods are equipped to handle them. The bulk package of frozen eggs supplied to the food industry is not suited to the needs of the housewife. It is necessary to thaw the entire container to obtain the small amount required at a particular time—and thawed eggs do not keep well. It also takes considerable time to thaw the bulk package, necessitating advance planning by the housewife.

The realization that frozen eggs would be suitable for most household purposes—in fact all uses except boiling and poaching—led to the attempt to freeze eggs in a form convenient for the home and satisfactory for retail distribution. These specifications were proposed:

1. The frozen egg package must be such that any given number of eggs may be removed without thawing the entire package.
2. The packaging must permit the required amount of frozen eggs to be counted rather than to be measured by volume or weight.
3. The time required for thawing must be fairly short in order that the housewife need not plan ahead.
4. The package must be attractive, economical, and of a form that can be placed in the low-temperature refrigerator of the retail store and in the freezing unit of the home refrigerator.

Fortunately, it was possible to meet all these specifications simply by freezing eggs in units that are equivalent to a medium-size egg. The units were frozen separately or joined slightly so that any given number could easily be removed from the package as required. The time for thawing was regulated by adjusting the dimensions of the unit of frozen egg material.

Breaking and Processing

Eggs are broken and processed in accordance with accepted practices in the food industry. Commercially, the frozen egg pack is produced mainly from eggs of U. S. standard interior quality. The eggs customarily frozen are those which cannot be profitably marketed in the shell because of an overabundant supply in the spring, or those which cannot comply with certain technical specifications unrelated to the food value of the egg meats.

The various types of frozen eggs now packed for the food industry may be prepared also for household use. Frozen "whole eggs" or "mixed eggs," which are mixed natural egg meats, are prepared as follows: Eggs (which have been kept cool) are candled and broken by skilled operators who judge their quality by odor and appearance. The egg meats are churned to break down the egg structure, strained through sieves to remove shell fragments, and then frozen. To prepare frozen egg whites, the whites are separated from the yolk, mixed, strained and frozen.

"Plain yolk" is untreated yolk used principally by mayonnaise and noodle manufacturers. Inasmuch as frozen yolk does not return to its original consistency upon thawing, certain soluble edible materials are sometimes added. "Sugared yolks" contain 10 percent of added sugar; "salted yolks," 7 to 10 percent of salt; "glycerine yolks," 3 to 7 percent of glycerine. Other materials, such as invert sugar and honey, are used to improve the smoothness and keeping qualities of the yolk.

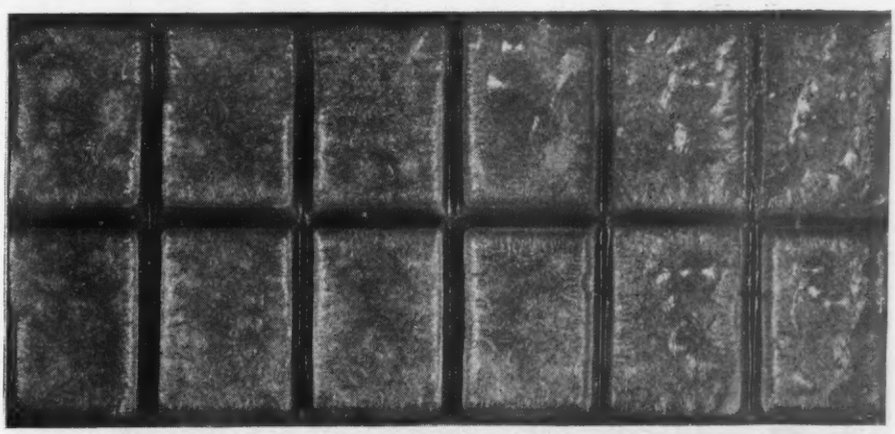


FIG. 1. Frozen egg yolk in detachable units, each equivalent to the yolk of an average size egg. The housewife can buy them by the dozen and use them one or more at a time. Whites and whole eggs can also be frozen in egg-size units

* Michigan Agricultural Experiment Station Journal Article No. 628 (n.s.); original title, "Eggs Frozen in a Form Convenient for Use in the Home."

Freezing Procedure and Equipment

The egg meats were frozen in separate or slightly joined units, each of which was equivalent to a medium-size egg. The units differed in dimensions, depending upon the type of product. For yolk, they were approximately 6x4x0.75 cm.; for whites, 6x6x0.75 cm.; for whole eggs, 8x7x0.75 cm. Figure 1 shows frozen yolks in detachable units.

The freezing equipment included trays, grids to divide the material into units, moistureproof sheeting, such as cellophane or Pliofilm, and a low-temperature refrigerator. The grids were constructed so as to produce the desired size of units—that for yolks is shown upside down in Figure 4. The bottom part of the grid, which ordinarily would come in contact with the yolk, had a bevel to aid in the release of the frozen material. And it was held about 3 mm. off the tray by the outside rim so that the egg units were connected slightly during freezing. It is possible that continuous freezing in units could be done by using a partitioned endless belt traveling in a freezing chamber.

Inasmuch as frozen egg material, particularly yolk, sticks to metal, the trays were lined with moistureproof cellophane, Pliofilm, or some similar sheeting, and the grids had a film of ice frozen upon them. The egg material, therefore, had to be precooled to just above freezing. This procedure was considered the best of those tried.

In practice, the trays were lined with sheeting, the iced grids inserted, the properly prepared and cooled egg material introduced, and the trays placed in the refrigerator. After freezing, the egg products were removed from the trays and grids, wrapped in moistureproof cellophane and sealed by heat or Scotch tape.

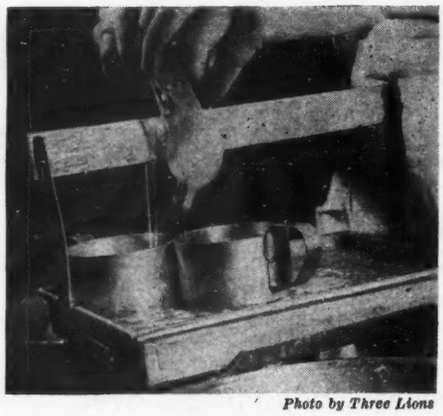


Photo by Three Lions

FIG. 2. In freezing plants eggs are broken over a bar and dropped into cups.

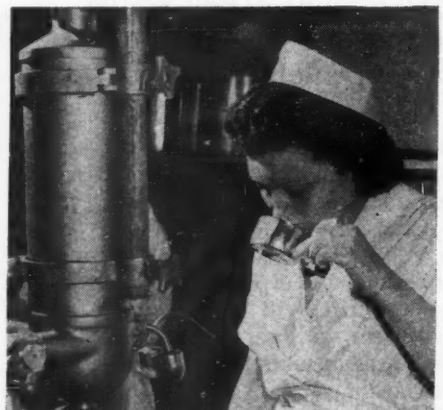


Photo by Three Lions

FIG. 3. After breaking, the eggs are inspected by smell to assure quality.

FIG. 4. Separating grid and tray used to freeze egg yolk in egg-size units.

Frozen egg products should be kept frozen until they are to be used. In retail markets the eggs should be stored and merchandized with frozen foods. In the home they should be held in the frozen-storage compartment of the refrigerator.

Thawing Time

Prepared as described, the egg units thaw in about 10 minutes at room temperature, but thawing may be hastened by placing them in warm water or in a hot pan, depending upon their intended use. If it is desired to lengthen the thawing period, it is only necessary to change the dimensions of the unit.

Sanitation

Being a highly nutritious food, eggs are an excellent medium for the growth of organisms. Since the high nitrogen and sulphur contents give eggs particularly bad odors and flavors when they are decomposed by microorganisms, it is imperative that sanitary measures be rigidly enforced if high-quality products are to be produced. Good shell stock, thorough candling, bacteriological cleanliness, plenty of refrigeration, properly designed equipment and laboratory control are essential.

Most eggs are sterile when laid. In fact, egg white has the ability to destroy bacteria. But yolk and mixed whole egg are very susceptible to spoilage. Present-day commercial practice has resulted in excellent frozen products. The food manufacturers prefer these products as a protection against the occasional bad egg which might be overlooked by their employees not skilled in the detection of off-odors and off-flavors. There is no reason, therefore, why frozen egg products packaged for home use cannot live up to the high reputation of the current commercial products—which are clean, wholesome, uniform perishables. Since frozen egg products may be used in ice cream, candy, and salad dressings which are not sterilized by cooking, the importance of quality in frozen eggs is obvious.

References

V. T. Johnson, Frozen and Dried Eggs, *Journal of American Veterinary Medical Association*, vol. C, No. 783; 479–483, 1942.

Eggs and Egg Products, U. S. Department of Agriculture Circular 583, p. 61, 1941.

M. E. Pennington, The Freezing of Eggs, *U. S. Egg and Poultry Magazine*, p. 91, February, 1942.

Granular Type Cheese Saves Time, Labor and Equipment

By J. C. MARQUARDT, New York State Agricultural Experiment Station, Geneva, N. Y.

More cheese of this type should be made during the emergency. It is so nearly like cheddar that the two are difficult to distinguish from one another. The author discusses the procedure for making the granular cheese and the advantages

LIKE all other manufacturers, cheese processors face shortages of labor and materials. Which means that they should put into practice methods that will save time, require less labor and utilize fewer machines. This is particularly true of those manufacturing cheddar cheese, because 90 percent of our cheese is of this type and the government, in buying about 50 percent of current cheese stocks, is principally interested in cheddar.

A commendable speed-up has been achieved in some large cheese plants by utilizing high-quality milk, good sanitary practices, good starters and good equipment. With these improved practices only four hours is required from heating the curd to salting. Even so, the cheddar procedure—which has changed but little in 50 years—involves matting and milling the curd. These operations, which are time consuming and require much effort, can be dispensed with if granular type cheese is made instead of cheddar. It is possible to reduce the time from cooking to salting to 2 hours in making the granular product. And there is so little difference between cheddar and granular cheese that the consuming public cannot tell one from the other, especially when the cheeses are consumed fairly young. Technically, however, it is likely that the elimination of matting and milling in making the granular product restricts the use of the name "cheddar."

The granular, or stirred cured cheese, was the first type made in America. Matting and milling were introduced only when we started to export cheese to England and there was a demand for a more firm cheese. This caused American cheese makers to adopt the English practice of matting and milling. Today, when better milk is available, when controlled curing is possible, and when the demand for a dry firm cheese is almost gone, except export cheese, there are fewer reasons for the general use of matting and milling. Furthermore, the great improvement in the purity and solubility of cheese salt has been a factor in making better quality granular cheese. The fact that curd mills require critical materials and motors is another reason favoring the granular process. All this adds up to the fact that more granular cheese should be made during the emergency. Excellent cheese for long curing has been made by the granular method, but this is generally not advisable.

Where cheese is being manufactured for the first time, the granular type offers a very important advantage in that it requires no curd mill, with its critical materials and motor.

In comparing the cheddar and granular procedures, the points in favor of the cheddar process always hinge on making better cheese out of low-quality milk. The granular process lends itself more to success by employment of good-quality milk. It must be remembered that high bacteria counts, milk held for a day or more, old or contaminated starters, and vats with large areas of exposed copper are significant factors in producing low-quality cheese regardless of the procedure employed.

Making Granular Cheese

When granular cheese is made from raw milk, less than 1 percent of starter is used; pasteurized milk utilizes 1 or 2 percent of starter. The setting temperature is the same for granular as for the cheddar type. Instead of using 3 to 4 oz. of rennet, as for cheddar, the granular cheese is made better with 4 to 5 oz. per 1,000 lb. of milk.

The curd, when cut, should be heated from 86 to 98 deg. F. in about 30 minutes. When the acid development has increased in the whey about 0.03 percent, the temperature should be slowly raised to about 104 to 106 deg. F. After the curd is properly firmed, the whey is drawn. High-acid milk should be heated to 104 to 106 deg. F. without the period at 98 deg. F. to stop the further acid development which is favored at the lower temperature.

This cheese is made most successfully from milk testing 3.7 to 3.9 percent fat. With such milk, the salting rate is 3½ lb. per 1,000 lb. of milk. The drained curd is stirred to prevent matting while being salted. Cooling the curd with water at this stage produces Colby type cheese. It has the technical advantage of keeping the particles from matting. When the salt has dissolved, the cheese is hooped as in the cheddar process.

An important detail in making granular cheese is that the curd particles be of the proper texture when the curd is drained. When curd of the correct texture is chewed, the particles give a sensation similar to moving rubber bands beside the teeth. Also, at this critical stage the curd particles should rebound 6 in. or more when dropped 3 ft. to a hard surface. Needless to say, the acidity of the whey should increase to about 0.05 percent, the desirable range being 0.03 to 0.07 percent.

Moisture control in granular cheese is not too difficult. The cheese should have a total solids content of 61.0 percent or greater. The fat content should range from 31.5 to 33.0 percent when the cheese is one month old. Legally, cheddar and granular cheese must contain 39 percent of moisture or less. If made as the Colby type, the Federal standard allows a moisture content of 40 percent.

The salt percentage should be about 1.5. This can be attained easily if the 3.5-lb. salting rate is used and the pressure is applied very slowly during the first two hours that the cheeses are in the press.

Controlled Atmosphere Storage Helps To Keep Fruits Fresh*

By D. V. FISHER, Assistant Superintendent, Dominion Experimental Station, Summerland, B. C., Canada.

Marketable life of apples, particularly certain varieties, extended. Excellent results obtained with pears. But benefits not so pronounced with stone fruits. The author gives a comprehensive review of gas storage and its applications

EXPERIMENTS first reported upon by Kidd and West of England in 1927[10] introduced a new idea in the storage of fruit under refrigeration. This idea was "gas storage," or "controlled atmosphere storage" as American investigators have chosen to call it. Under this type of storage, fruits are held in atmospheres the composition of which differs from that of normal air in the relative percentages of oxygen, carbon dioxide and nitrogen gases. Normal air has a composition of roughly 79 percent nitrogen, 20 percent oxygen, and 1 percent of carbon dioxide and other rare gases. Kidd and West found that increased carbon dioxide and reduced oxygen in the atmosphere in which the fruit was stored greatly reduced speed of ripening of the fruit, delayed changes in skin color from green to yellow, and prolonged storage life. They also found that with certain varieties still greater reduction in the oxygen content of the storage air further improved keeping quality of the fruit. Thus for the Lane's Prince Albert variety of apple, Kidd and West in 1933[11] reported that a mixture of 2.5 percent oxygen, 5.0 percent carbon dioxide and 92.5 percent nitrogen doubled the storage life of this variety in comparison with similar fruit held in air at the same temperature. Their experiments proved so successful, particularly with the Bramley Seedling variety, that at the present time much of the English crop of this is held in gas storage.

Before discussing how controlled atmosphere storage works with other varieties of apples and other fruits, it is worth while considering how these controlled atmospheres are developed. If fruit is enclosed in a sealed gas-tight compartment and allowed to remain there, the oxygen of the air is gradually converted into carbon dioxide through respiration of the fruit. The carbon dioxide content of the air rises while the oxygen is correspondingly reduced. When the desired carbon dioxide level is reached, sufficient outside air is continuously admitted to carry away excessive carbon dioxide and prevent the oxygen level from dropping below the desired point. This system of providing an artificial atmosphere might be called "regulated-ventilation controlled-atmosphere cold storage." By this system the total percentage of carbon dioxide plus oxygen cannot exceed 20 percent, because each percentage accumulation of carbon dioxide represents a parallel loss of oxygen.

When an atmosphere very low in both carbon dioxide and oxygen is desired, such as 2.5 percent oxygen and 5.0 percent carbon dioxide, as described for the Lane's Prince Albert apple,[11] special methods of preparation become necessary. The first procedure is the preparation of a thoroughly gas-tight room. This is not easy to achieve as concentration differences of gases between inside and outside the room set up gradients which make complete suppression of gaseous exchange most difficult. However, various gas-proofing paints are available which when applied to a smooth putty-coat plaster give very fair gas-tightness. Various methods for making rooms gas-tight have been described by Smock[20] and Phillips.[18]

Having obtained a reasonably gas-tight room, the apples are placed in it through a door that can be sealed. The respiration of the fruit will deplete the oxygen in the room, and build up a corresponding concentration of carbon dioxide. When the fruit has built up a carbon dioxide concentration of 5 percent, the oxygen will have been depleted to 20 − 5 = 15 percent. However, an oxygen concentration of only 2.5 percent is desired, so special measures must be taken to bring this about. The method used is to allow the fruit to gradually deplete the oxygen content through respiration to the 2.5 percent level, but at the same time, the excess of carbon dioxide over 5 per cent is absorbed in a caustic soda scrubber unit. This unit is tightly attached to the storage room and the carbon dioxide laden air is drawn into the scrubber by means of an electric fan, where it is washed in a spray of caustic soda and then returned to the storage room minus the carbon dioxide. The necessary frequency for operating the scrubber unit will depend upon the respiration rate of the fruit.

Response of Varieties to Controlled Atmospheres

Experimental work with apples has shown that varieties differ from one another in regard to their response to controlled atmosphere storage. Most varieties of apples retain firm and crisp texture best at 30 to 32 deg. F., but at this temperature some varieties such as McIntosh, Yellow Newtown and Bramley Seedling develop browning around the core when subjected to prolonged refrigeration. These same varieties when stored at 40 deg. F. in a controlled atmosphere of the proper composition keep as well or even better than when held at 32 deg. F. and do not develop core browning. For McIntosh, Phillips[19] recommends an atmosphere of 7 percent carbon dioxide : 12 percent oxygen at 40 deg. F., while for the same variety, Smock[21] recommends an atmosphere of 5 percent dioxide : 2 percent oxygen at 40 deg. F. Given this treatment, Smock reports that length of keeping life of McIntosh is doubled in from five to ten months. Improved keeping was also reported by Phillips, particularly with respect to elimination of core

* Contribution No. 606 from the Division of Horticulture, Experimental Farms Service, Dominion Department of Agriculture, Ottawa, Canada.

browning. Work at the Summerland Experimental Station has confirmed Phillips' findings with McIntosh.

Controlled atmosphere storage experiments with the Delicious apple have revealed that with this variety carbon dioxide, unless in the presence of a very low percentage of oxygen, is actually deleterious rather than beneficial to keeping life. Fisher[6] found that for delaying softening and mealiness in Delicious, a storage atmosphere consisting of no carbon dioxide, 2.5 percent oxygen, and the balance nitrogen, gave best results. Fruit removed for examination after five months' controlled atmosphere storage using the above atmosphere at 32 and 40 deg. F. was crisp and firm, whereas similar check fruit held at the same temperatures was beginning to get soft and mealy. After removal from cold storage, the controlled atmosphere fruit remained in first-class condition at 60 deg. F. about ten days longer than check fruit.

With the Jonathan variety, Plagge[14] reports that a controlled atmosphere of 7 percent carbon dioxide and 13 percent oxygen greatly prolongs keeping life, retains firmness, retards changes in green skin ground color and eliminates development of Jonathan spot. He concluded that with fruit held at 32 deg. F., carbon dioxide stored Jonathan was a better product in June than air-stored fruit in February.

Allen found[1] that Yellow Newtown apples stored at 42 deg. F. in an atmosphere of 5 or 10 percent carbon dioxide, with corresponding concentrations of 15 and 10 percent oxygen, were in good eating condition after 25 weeks, whereas similar fruit held in air at 36 and 42 deg. F. was completely overripe. Yellow Newtown grown in California are at times susceptible to internal browning when stored at temperatures below 40 deg. F., but above this temperature they develop little of the disorder. Since ordinary 40-deg. F. storage for Newtowns greatly reduces their storage life, storage at 40 deg. in a carbon dioxide atmosphere has the advantage of retarding ripening and at the same time preventing internal browning.

Response with Pears

Controlled atmosphere storage experiments with Bartlett pears by Allen[2] and Truscott[23] have indicated that at 32 deg. F. a concentration of 7.5 to 10 percent carbon dioxide in the storage air doubles the keeping life of this fruit. At higher temperatures of 36 and 45 deg. F., Allen found that Bartlett pears stored in atmospheres containing carbon dioxide kept much longer than fruit held in air at the same temperature.

Gerhardt[8] found that Bartlett pears held in 20 percent carbon dioxide at 45 deg. F. for 20 days kept in as firm condition as similar fruit held in air at 32 deg. F. Fruit subjected to this treatment ripened normally without impairment of dessert quality. Treatmen of this nature may have value in long-distance shipments during hot weather or with fruit which is fairly advanced in ripening. It would involve the additional expense of dry ice (solid carbon dioxide) and the use of refrigerator cars well sealed against the excessive loss of the carbon dioxide gas.

No very extensive work has been done with controlled atmosphere storage of citrus fruits. However, Stahl and Cain[21] in Florida found that controlled ventilation experiments with Marsh grapefruit and Valencia oranges, where an atmosphere of about 6 percent carbon dioxide and 12 percent oxygen at 37 deg. F. was maintained, resulted in greatly improved keeping quality as compared with air storage. Shrinkage was greatly reduced under controlled atmosphere ventilation storage, as also were softness, sogginess and pitting. Controlled ventilation storage maintained a brighter skin color and greater flesh firmness. Valencia oranges after 16 weeks of controlled ventilation storage were 90 percent marketable, whereas air-stored fruit was 100 percent unmarketable. Samisch,[17] working in California, found that with Valencia oranges 18 to 22 percent of carbon dioxide mixed with air tended to injure the skin.

Dry Ice as Source of Carbon Dioxide and as Refrigerant

Reference has been made to the use of dry ice (solid carbon dioxide) as a source of carbon dioxide in the shipment of pears during hot weather. Some further mention of it will be

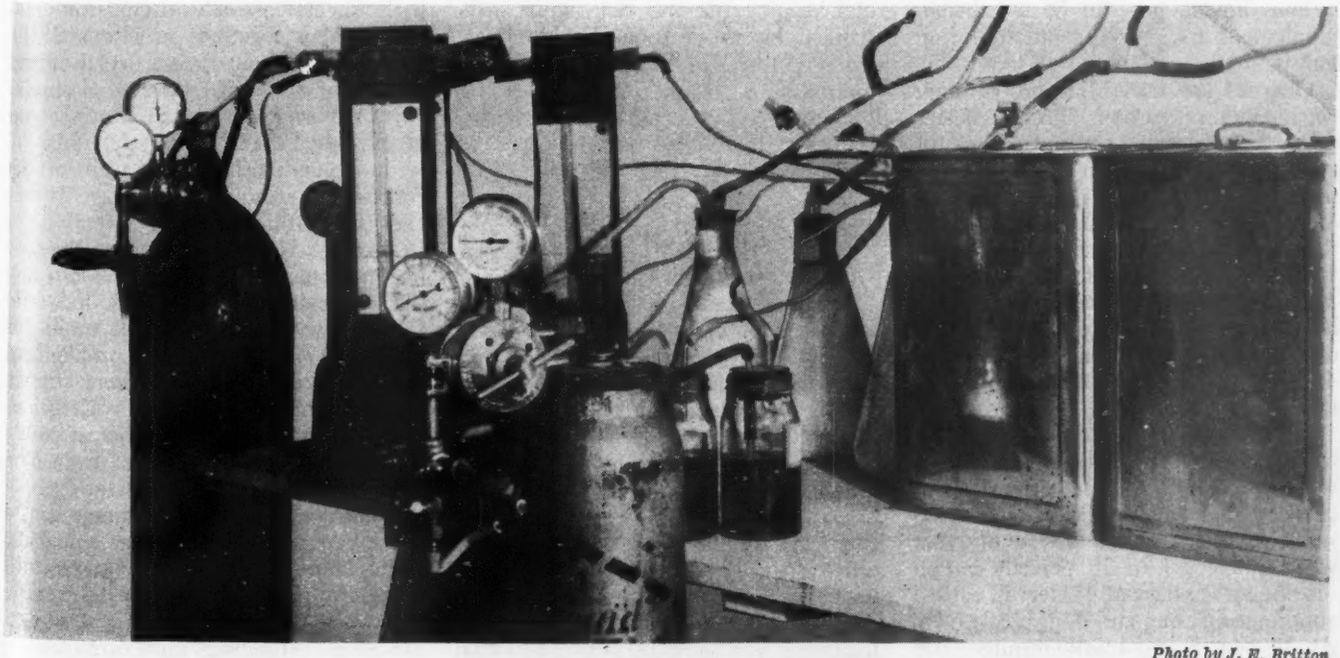


Photo by J. E. Britton

Apparatus used in controlled atmosphere fruit storage investigations at Summerland Experimental Station. In small-scale experiments the desired mixtures are made up from cylinders of oxygen, nitrogen and carbon dioxide.

made in connection with cherries. Dry ice is carbon dioxide gas reduced to a temperature of −109 deg. F., at which it solidifies. One pound of solid carbon dioxide at 32 deg. F. will give off 8.1 cu. ft. of gas. At −109 deg. F. carbon dioxide sublimes (that is, changes from a solid to a gaseous state), and in changing from a solid at −109 deg. F. to a gas at 32 deg. F., absorbs 275 B.t.u., which is approximately twice the amount of heat, 144 B.t.u., absorbed by ice melting. However, the cost of dry ice as a refrigerant, except for special purposes, is prohibitive. In fruit storage its principal use is as a source of carbon dioxide.

Controlled Atmospheres for Stone Fruits

Among the stone fruits, cherries have responded most favorably to controlled atmosphere treatments. Extensive trials by Gerhardt *et al*[7] and Smith *et al*[18] in Washington have shown that cherries shipped to the New York market in refrigerator cars with a supplementary change of dry ice have arrived in brighter, more attractive condition than fruit shipped under ordinary refrigeration. They suggest that at least 1,000 lb. of dry ice is required per car, and that part of this should be placed in the car when loaded and the balance at suitable re-icing points en route. In addition to maintaining the appearance of the fruit, gas treatment had a very pronounced effect upon inhibiting the development of rot or mold organisms in transit. Smith *et al*[18] consider that where mature fruit or fruit damaged by rain is being shipped, carbon dioxide gas can be a valuable supplement to ice refrigeration during transit.

Cherries are fairly tolerant of high percentages of carbon dioxide, for in these experiments concentrations of gas in the cars went at times over 20 percent. Ryall[16] also demonstrated a high carbon dioxide tolerance for cherries by storing them for 20 days at 45 deg. F. in 25 percent carbon dioxide. This fruit was removed from storage in perfect condition and with flavor unaffected. Similar fruit held in air at 45 deg. F. for the same time was spoiled.

Controlled atmosphere experiments with plums, peaches and apricots have not received the same attention as cherries, and have not yielded as good results. Gerhardt *et al*[7] found that with apricots, 5 to 20 percent carbon dioxide for 10 days at 45 deg. F. caused abnormal ripening and flesh breakdown. At 36 deg. F. no injury resulted, but the length of time to reach optimum dessert quality was delayed only two days compared with checks stored in air.

Allen and Smock[2] found that with plums subjected for 6 days to 20 to 80 percent carbon dioxide, coloring and softening were markedly retarded, and the time required for the fruit to ripen after leaving storage was doubled over that of checks held in air. Ryall[16] reported that with Italian prunes all lots treated with carbon dioxide were firmer and showed less mold development after storage than untreated lots. Flavor was not harmed by the treatment.

The response of peaches to controlled atmosphere storage has not been sufficiently outstanding to warrant any optimism regarding its use. Peaches are a highly perishable fruit, and an extension in storage life of only a few days at best can be hoped for. Allen and Smock[2] found that J. H. Hale peaches exposed for 6 days to 15 percent carbon dioxide at 45 deg. F. required 3 days longer to ripen at 65 deg. F. than check fruit. The quality of both treated and untreated lots was good. Huelin *et al*,[9] in Australia, found that while the average cold storage life of peaches at 32 deg. F. is about 6 weeks, storing in controlled atmospheres containing 8 to 10 percent carbon dioxide lengthened the storage period by about 10 percent. Gerhardt *et al* found that with J. H. Hale and Elberta peaches held in 10 or 20 percent carbon dioxide at 36 or 45 deg. F., color development and softening were retarded in storage and the fruit took one to two days longer than checks to ripen after removal to air, but that total keeping life was not significantly changed by the carbon dioxide treatment. Fisher and Britton[4] found no improvement in keeping quality of Rochester, Vedette and Valiant peaches when these were held in an atmosphere of 7.5 percent carbon dioxide at 40 deg. F.

Carbon Dioxide for Holding Berries

Excellent results have been secured with the use of carbon dioxide in facilitating the marketing of strawberries and raspberries. These fruits mold very easily, particularly when the fruit is caused to "sweat" by moving it from cold storage to warm room temperatures. Van Doren *et al*[28] found that strawberries kept in good marketable condition for 3 to 4 days with 15 percent carbon dioxide at 50 deg. F., and remained in first-class condition long enough to be sold by the retailer. This treatment was superior to ordinary cold storage at 32 deg. F. because of the better color of the berries, less "sweating" with subsequent mold, and slower ripening. Winter *et al*[24] found that treating freshly picked raspberries and strawberries with 40 to 45 percent of carbon dioxide for 24 hours improved shipping quality, reduced spoilage when marketed, and increased the time the fruit could be held in marketable condition. In another experiment, Winter *et al*[25] found that at 55 to 60 deg. F. an initial treatment of 30 percent carbon dioxide for berries was preferable to concentrations of 45 percent, or more, due to loss of flavor with the latter treatment.

Commercial Application

The general adaptability of controlled atmospheres in the storage of fruits is at present rather limited. In the first place, our cold storage warehouses have been built for ordinary air storage and do not lend themselves readily to gas-proofing. The matter of gas-proofing a controlled atmosphere storage warehouse is difficult and expensive to achieve, as judged by results secured from small scale gas-proofing experiments. Where an atmosphere is set up in a closed compartment with one or more components of that atmosphere different from ordinary air, a tremendous gradient is formed tending to equalize the relative concentrations of the gases inside and outside the compartment. The smallest cracks or leaks, and even the porosity of ordinary lumber, permit heavy gaseous exchange, and make it difficult to maintain controlled atmospheres in the storage rooms. One way to obtain adequate gas-proofing is to line the storage room with sheets of galvanized iron and solder them together, or else seal the joints with heavy grease. Galvanized iron is, of course, at present unobtainable, but even in normal times would be expensive used in this way. Smock[20] recommends plastering the walls of the controlled atmosphere storage room and then sealing it with several coats of paint. He also describes the use of aluminum foil as a gas seal. In any case these methods are suggested only for use with small storage units of 2,000 to 5,000 bu. The problem of adapting controlled atmosphere storage to large storage warehouses with brine-spray air circulation would be extremely difficult, if not impossible, from the practical standpoint.

Controlled atmosphere storage is also more expensive than regular cold storage as more regulation is required, and there is the additional cost of caustic soda where carbon dioxide scrubbers are used. Moreover, men cannot work in controlled atmosphere storages as

(Turn to page 122)

U. S. Production of Oil of Dill

By ERNEST GUENTHER
Chief Research Chemist, Fritzsche Brothers, Inc., New York, N. Y.

PART I—With war blocking the importation of many popular flavoring materials and spices, production of these materials, or of substitutes, in the United States becomes increasingly important. Successful production of dill and its products shows what can be done along these lines

COMMON garden dill, *Anethum graveolens* L. (family Umbelliferae, resembles the fennel plant (*Foeniculum vulgare* Mill.) but is smaller. It belongs to the parsley family. An annual or biennial plant, it grows three or four feet high. The flowers are yellow. The entire plant is aromatic, but most of the volatile oil is contained in the seed (fruit). Dill leaves are used as a seasoning for soups, sauces, and especially pickles; the seed as a condiment. From both the whole herb, including the unripe fruit, and from the ripened and separated fruit, the essential oil is obtained by steam distillation.

The two oils, however, differ in composition and, therefore, in odor and flavor. The so-called weed or herb oil (distilled from the aboveground parts, including the unripe seed) is today preferred by the food industry because of its finer dill herb character. The seed oil, with its high carvone content, resembles oil of caraway. During the last few years, dill herb oil has largely replaced the whole herb for flavoring and seasoning purposes.

Habitat and Range

Anethum graveolens is a native of Southern Europe, growing wild in various parts of Europe, including Southern Russia, and also in Africa and Asia. It is quite extensively cultivated in Hungary,[1] Germany and England. Although the herb was introduced into our gardens many years ago, commercial planting was not started until about 1930. It is because of the pioneer work of A. E. Slessman of Fremont, Ohio, that the United States is today totally independent of its former European sources of supply.

The herb, as well as the oil, is produced on a large scale in Ohio, Idaho and Oregon, hundreds of acres being under cultivation. The dill oil industry has set a fine example of what can be accomplished in the United States regarding the production of aromatic herbs and essential oils formerly monopolized by Europe.

According to Crooks and Sievers,[2] dill can be grown in the North Central States and possibly in some of the cooler irrigated valleys in the West, where drying of the crop would be less of a problem than in more humid regions. Dill culture on a commercial scale for the production of seed for the condiment trade does not appear to offer much opportunity. That it can be grown as an annual and requires no seedbed propagation are favorable factors, but the market outlet is limited and the gross returns are not large. Loss of seed by shattering, and the fact that harvesting must be done at just the right stage, may make it difficult to fit the crop into general farming operations.

Courtesy Fritzsche Brothers, Inc.
Stalk of fruiting dill weed ready for harvest.

The present production of dill herb and dill seed oils in the United States is absolutely sufficient to cover domestic requirements, and any large-scale extension is only likely to lower market prices to uneconomical levels.

Planting[3]

Dill grows well in any good garden soil, a fertile prepared sandy loam being most suitable. Light sand or heavy clay should be avoided. Although a native of Mediterranean countries, dill is quite a hardy plant and may grow in much cooler climates, provided it finds a warm situation and well drained soil.

Dill is best grown as an annual crop. The land should be plowed in the fall, or as early in the spring as the weather permits. The usual procedure is to sow the seed, very early in the spring, about ½ in. deep, with specially constructed drills. The rows are spaced at 14 to 18 in., the drills 1 ft. apart. Depending on the method of cultivation for the control of weeds, the rows are sometimes spaced as far as 3 ft. apart. It is claimed that the seed crop is better when the plants are not crowded too much. For this reason, too, the plants should be thinned at the proper time so that their distance in the rows is not less than 6 to 15 in.

Experienced growers try to plant dill herb over a three-week period, so that it will mature during three weeks. By staggering the time of planting, the growers can harvest the herb while it is in prime condition without getting much overmature herb. This feature has great influence upon the quality of oil distilled. Unfortunately, it is seldom possible to plant in this way, as the weather controls seeding and the seed must be drilled when the weather permits.

One-half ounce of seed suffices to sow 150 ft. of drill; at this rate, one pound should sow one acre.

Good results have been obtained by sowing late in the fall; then the seed germinates in the spring as soon as conditions become favorable. This is often much earlier than the ground can be prepared and the seed planted, with spring sowing.

When planted early in spring, the herb produces seed that same year. However, if conditions do not favor

prompt germination and rapid early growth, the plants may not reach full development and the seed crop will be small.

Frequent cultivation and freedom from weeds are essential to good crops. Thus, dill is cultivated by hand as soon as the young shoots break through the ground. Hand weeding follows, and then cultivation three or four times with power cultivators. The hand weeding is often done by school boys working in groups of 15, each group guided by an older supervisor. The boys like that job because it brings them considerable spending money.

Dill herb seems to be more susceptible to weather hazards than most crops. If heavy hail hits the plants during the flowering period, they may be injured so much that the yield of oil is practically nil. The same might happen through damage by strong winds or driving rains. Extreme heat during the critical period of maturity is apt to blight the herb, with similar results in regard to yield of oil.

Harvesting

Proper timing of the harvest is very important, the quality of oil depending mainly upon the state of maturity of herb and seed. The harvest takes place in early fall.

If the crop is grown for the production of herb (weed) oil, it should be cut when the most advanced seed is turning brown. Since herb oil is used mainly as a substitute for the herb in pickling, the crop must be harvested at exactly the stage when the flavor of the oil is identical to that of the herb as it is generally employed. By staggering the planting time, large areas can be harvested at the proper stage of maturity. Specially built binders are used to mow the herb. It is advisable to harvest only as much as can be processed in the distillery during one day. After very short drying in the fields, the herb is hauled to the distillery. Drying for many hours in the field would result in considerable loss of oil by evaporation, especially of the more volatile terpenes. Consequently, the oil distilled from dried herb would be relatively high in carvone, a feature not desirable in herb oils.

When, on the other hand, the crop is grown for seed, a different harvesting procedure must be followed. Crooks and Sievers[3] point out that the progressive ripening of the seed and the tendency of fully ripe seed to shatter involves the same difficulties in the harvesting of dill seed that are met in the case of the other aromatic seed crops. The best practice seems to be to mow the plants when the earliest seed is ripe. In very dry weather this is preferably done early in the morning when the plants are damp with dew. The harvested material may be placed in small cocks in the field until dry, when the seed can be easily threshed out. In the case of small plots, the upper parts of the plants may be cut by hand and the material deposited on canvas sheets in which it is taken from the field when dry, thus avoiding loss from shattering; or in case of bad weather, it can be taken directly to a barn or outbuilding and dried under cover. This procedure, however, is impractical for even small acreages of the crop. The threshed seed should be spread in a thin layer and turned over frequently until thoroughly dry.

Courtesy Prinsenhe Brothers, Inc.

The dill weed is forked into the stills or raised by a crane

Distillation of Herb (Weed) Oil

Mr. Slessman of Fremont, Ohio, operates six large and modern stills, each holding about 2,000 lb. of green herb. Steam generated in a separate steam boiler is blown through each tank for 1½ hours and the oil is separated in a Florentine flask. The yield of oil varies from 20 to 30 lb. per acre; it might be higher or lower in exceptional years.

Other producers extend the time of distillation to 4 hours.

The quality of the oil runs about uniform, provided the herb is harvested at the proper moment. The herb should be distilled when rather fresh; otherwise, the seed attached to the stacked plant material continues to ripen and the oil thus obtained approaches the seed character. The drier and more mature the herb, the longer is the time required to complete distillation. Yield of oil increases with the state of dryness, but only to a certain point, because the dried herb containing an abundance of fully ripened seed is very difficult to distill. In fact, it is sometimes impossible to exhaust such plant material, the uncrushed seed yielding its oil only partially and that very reluctantly. Distillation of such mature herb is a long drawn out process, lasting sometimes 8 or 9 hours; the oil is very high in carvone, resembling dill seed oil in that respect.

In a previous publication,[1] the writer has given more exact data on the changes that occur in the chemical composition of dill oil during the various stages of plant maturity.

Distillation of Dill Seed Oil

In the same paper,[1] the writer also described distillation of dill seed oil as carried out in Europe. So far, the United States has produced only small quantities of dill seed oil, our food and pickle industries definitely preferring the herb (weed) oil. Dill seed oil, with its content of approximately 50 percent carvone, resembles oil of caraway seed in odor and flavor and could be employed as a substitute for that oil, should caraway seed no longer be available. Caraway oil has been produced almost exclusively in Holland and Russia, which sources of supply are now very difficult of approach, if not inaccessible.. Dill seed oils, with their high carvone content (about 55 and even 60 percent), might also serve for the isolation of carvone. Oil of Indian dill seed (*Peucedanum sowa* Kurz) contains dill apiol and much less carvone than European dill oils.

Distillation of dill seed oil, like that of any seed material, offers some difficulties of operation; it requires special equipment for crushing the seed, special stills adapted to seed distillation, and so forth. The seed must be distilled immediately after crushing, as even short exposure of the crushed material to air results in considerable loss of oil by evaporation. One acre produces about 500 to 700 lb. of dill seed; the yield of oil from the seed is 2.5 to 3.5 percent.

Part II of this article, covering the physical and chemical properties of oil of dill and the uses of dill herb (weed) oil and dill seed oil in food manufacture will appear in an early number.

References

1. E. Guenther, Hungarian Essential Oils: Oil of Dill Seed and Dill Herb, *American Perfumer*, June, 1938.
2. "Condiment Plants," United States Department of Agriculture, Bureau of Plant Industry, July, 1941.
3. See also Stockberger, "Drug Plants Under Cultivation," United States Department of Agriculture, *Farmers' Bulletin* No. 663.

How To Keep Trucks Rolling Told by ODT

Manual on preventive maintenance and inspection procedure, prepared by automotive engineers and issued by ODT, gives basic plan upon which to build flexible maintenance system

TO help fleet owners, including those in the food industry, keep their vehicles in operation for the duration, an eight-page manual entitled "Report on Preventive Maintenance and Inspection Procedure" has been issued by the Office of Defense Transportation. Prepared for the ODT by the Society of Automotive Engineers, the manual tells in nontechnical language what work should be done, and when, on all classes of motor vehicles in order to get maximum service out of them at a minimum of expense.

The manual boils down the experience and methods of the country's largest fleet owners and maintenance experts. It should be of great value to the smaller fleet owner in the food field who previously has not given extensive attention to his vehicle maintenance problem, but who now finds it imperative to keep his present trucks rolling to stay in business.

For those food field fleet owners, both small and large, who have been unable to replace trained mechanics drawn into the armed forces by capable technicians, the manual will be of help because it lists and explains the various steps and factors to be considered in the upkeep and service work. It further designates which of the work may be entrusted to the least-skilled men and which inspection and repairs should be reserved for expert hands.

In prewar days the maintenance cost on fully depreciated older trucks was compared with the lesser maintenance cost on new vehicles, plus depreciation charges, and when the latter cost was less than the former, the older units were sold and replaced by new vehicles. Now, with new equipment unavailable for the duration and for sometime thereafter, the relative cost per ton or per mile is of less importance and preventive maintenance is imperative.

Automotive articles in FOOD INDUSTRIES have often explained the preventive maintenance systems employed by individual companies in the food field, but the ODT manual seeks to outline a basic plan upon which to build a flexible procedure for all companies, both large and small, with all various combinations of types of equipment.

TABLE I—Classification of the parts of passenger cars and trucks for purposes of preventive maintenance and inspection.

1. Axle, front
2. Axle, rear
3. Body and cab
4. Brake system
5. Clutch
6. Cooling system
7. Electrical system
8. Engine
9. Frame springs and mounting
10. Fuel and exhaust system
11. Special equipment
12. Steering system
13. Transmission
14. Propeller shaft (or drive line)
15. Wheels, rims and tires

To make its recommendations effective under such all-embracing conditions, the manual divides the vehicles into nine classifications and then outlines the type and scope of inspection and repairs suggested for each classification. The nine classifications include passenger cars, light trucks operated in stop-and-start service, light trucks in long-haul service, heavy trucks in stop-and-start service, trucks and tractors in long-haul service, small buses in city service, small buses in cross-country service, large buses in city service and large buses in cross-country service.

In answer to the question as to what units, parts or items require maintenance in all of the above nine classifications, the manual suggests the following functional operations: *A*, adjustments; *T*, tests; *O*, oil, lubricant or grease; *L*, light or visual check-up; *H*, heavy or physical inspections and repair; *R*, replacements, rebuild or recondition.

One or more of the above common functions of maintenance can be applied to every part of the vehicle. However, to simplify the preventive maintenance system, it would seem desirable to group the various functional parts of a vehicle and then designate which group should receive the functional operations as listed in the preceding paragraph.

For instant reference to the various functional groups of parts, some index would assist in carrying out the functional operations. By dividing the vehicles into groups, systems, units, parts and functions, and assigning a number to each item, the manual designates 15 indices to obtain the desired flexibility.

To each of these groups indices, new units, parts or items may be added as new designs are made available to the fleet operator. The 15 index numbers include "1" for front axle; "2" for rear axle, and so forth, as shown in Table I.

The question of where one group of parts ends and the next group begins is a debatable subject, but the groups as selected are those most generally used and have a logical arrangement by systems. In addition to the number, each item in each group is given a letter. This provides the desired flexibility and permits new items to be added to their proper group under the proper alphabetical letter by adding the next number.

The above basic index, although relatively short, covers all of the vehicle parts or groups of parts, irrespec-

TABLE II—The key maintenance service table. Vehicles are divided into nine classifications.

Type of Vehicle	A	B	C	D	E
		Miles	Miles	Miles	Miles
Passenger cars	Daily	1,000 to 2,000	4,000 to 6,000	30,000 to 50,000	60,000 to 100,000
Light trucks, stop-and-start service	Daily	500 to 2,000	3,000 to 5,000	20,000 to 30,000	40,000 to 60,000
Light trucks, long-haul service	Daily	1,000 to 2,000	4,000 to 6,000	40,000 to 60,000	80,000 to 120,000
Heavy trucks, stop-and-start service	Daily	500 to 2,000	3,000 to 5,000	30,000 to 40,000	60,000 to 80,000
Heavy trucks, long-haul service	Daily	1,000 to 2,000	4,000 to 6,000	40,000 to 60,000	80,000 to 120,000
Small buses, city service	Daily	1,000 to 2,000	3,000 to 5,000	30,000 to 40,000	60,000 to 80,000
Small buses, cross-country	Daily	1,000 to 2,000	4,000 to 6,000	40,000 to 60,000	80,000 to 120,000
Large buses, city service	Daily	1,000 to 2,000	4,000 to 6,000	40,000 to 60,000	80,000 to 120,000
Large buses, cross-country	Daily	1,000 to 2,000	4,000 to 6,000	40,000 to 60,000	80,000 to 120,000

TABLE III—One of the detailed preventive maintenance service operations as applying to one functional group of parts—Group 1, Front Axle.

Code: A—Adjustments; H—Heavy or physical inspection or repair; L—Light or visual check-up; O—Oil, lubricant, or grease; R—Replacements, rebuild or recondition; T—Tests

		Maintenance service				
		A	B	C	D	E
1—A1.	Axle, center	....	L	H	H	R
1—A2.	Axle and wheel alignment	....	L	TA	TA	TA
1—B1.	Brake spider	....	L	H	H	R
1—S1.	Steering knuckle and pins	....	OL	OHT	OH	R
1—S2.	Steering arms	....	L	H	H	R
1—T1.	Tie rod assembly	....	AOL	AOH	AOH	R
1—T2.	Thrust bearings	....	OL	OH	OH	R

tive of vehicle size or type. By the use of this basic index in conjunction with the functional operations as previously given—such as *A* for adjustments, *T* for tests and *R* for replacements, rebuild or recondition—it is possible to set up a preventive maintenance system in tabular form. This tabular form by a combination of numbers and letters designates what functional operations should be performed on what items or groups of items.

The next and final step in the preventive maintenance set-up is to designate between what periods the functional operations should be performed. This may be done on the basis of time, of miles run or some other factor such as the number of gallons of fuel used in the engine.

All maintenance experts agree that there are many variables involved. These include the design of the vehicle, the operating conditions, the loads, road speeds, weather conditions and the types of lubricants used.

Many experienced maintenance men contend that vehicle wear varies more nearly with mileage run than with any other factor and that the frequency of maintenance functions should therefore be set up on a mileage basis. However, taking into account the many variables previously listed, it is apparent that no definite mileage intervals can be set to cover all fleet installations.

As a result, the manual sets up five different mileage periods, with a considerable spread in the mileage run in each period. These mileage periods are designated as *A*, *B*, *C*, *D* and *E*, as shown in the accompanying table.

A covers the detailed services which should be given daily, irrespective of mileage; *B*, the items to be taken care of between 500 miles and 2,000 miles, depending upon the truck classification; *C*, the items from 3,000 to 6,000 miles; *D*, the items between 20,000 and 60,000 miles; and *E*, those items between 40,000 and 120,000 miles of operation, all depending upon the classification of the equipment.

The *A* maintenance service includes such items as gas, oil and water and inspection for water and oil leaks and adequate brakes, horn and lights. The *B* maintenance service covers primarily the greasing and lubrication period. The types of lubricants best suited to the vehicle are usually specified by the manufacturer and it is recommended that such specifications be followed.

The *C* maintenance service includes the *B* service and, in addition, most of the adjustments and tests and a heavy or physical inspection with repairs. It may involve replacements in order to obtain the necessary adjustments or test results.

The *D* maintenance service covers the more extensive repairs such as replacement of piston rings, engine bearing adjustment and heavy unit replacements.

The *E* maintenance service is the period at which time the engine is removed, completely disassembled and rebuilt. Other units such as the steering mechanism, gearset and rear axle can be overhauled at the same period. Any extensive body repair work and chassis and body repainting can be done at the same time.

Food fleet operators can obtain, without charge, a copy of the manual reviewed in this article. Write to the Office of Defense Transportation, Washington, D. C.

Hunting for an acceptable substitute for 5-gal. cans for dehydrated foods, packaging specialists examine QMC tests at the Rochester, N. Y., plant of Beech-Nut Packing Co. A satisfactory paper package could save better than 500,000 tons of steel in 1943.

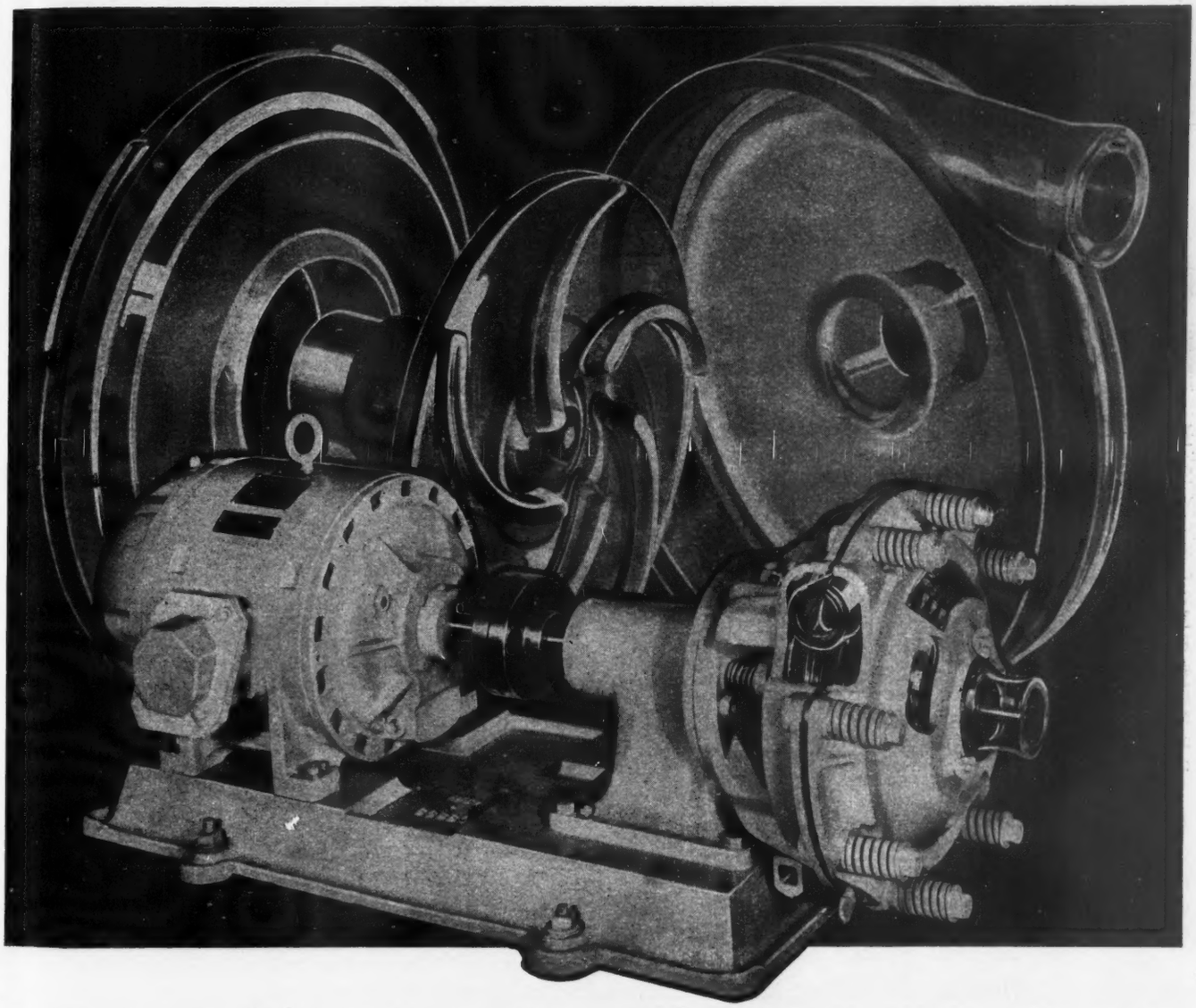
Surveys Acceptance Of Dehydrated Soup

Out of 1,294 Philadelphia housewives interviewed in a survey by the *Philadelphia Evening Bulletin*, 895 indicated that they used dehydrated soups. Of these, 407 believed the dehydrated soups to be much better than soups of other types, while 294 believed they were just good, and 191 did not like them as well. Of the 399 non-users, 95 make their own soups, 88 never tried a dehydrated product, 75 disliked their first sample, while 8 found canned soups easier to prepare.

Of the group which likes the dehydrated soups "much better," 180 preferred them because of their better flavor, 35 found them easier to prepare, 34 believed them to be cheaper.

The Nash *Pump of Glass*

is *transparent*, permitting constant check of color, sedimentation, etc.



Casing and moving element of this remarkable centrifugal pump are of "PYREX" brand heat and shock resisting glass. Perfect transparency permits constant observation of the interior of this pump and the material being handled. • The balanced glass impeller, rotating at 1760 R. P. M., delivers 6000 gallons of acid or other liquid per hour against a 65 foot head. • Hot acids, or brine cooled liquids may be pumped with equal facility. If cleaning is necessary, pump can be taken apart in a few moments. Reassembly is as quick, and adjustment is almost automatic. • There are many more exciting facts about this successful non-metallic pump. Write for your copy of Bulletin D-313 now.

NASH ENGINEERING COMPANY

208 WILSON POINT ROAD, SO. NORWALK, CONN.

NEW PACKAGES & PRODUCTS

Pastry Shells

SMALL pastry cups that can be filled with hors d'oeuvres, anchovy paste, caviar, cheese or shredded meat are among the unrationed items in popular demand in the New York market. "Eatsum Wafer Cups" manufactured by Mrs. L. M. Peterson & Co., Inc., Brooklyn, N. Y., are crisp little pastry shells designed to hold berries, jelly, jam or honey to be served as appetizers or an accompaniment to cocktails. They are packed in a cylindrical fiberboard container, with tinplate ends.

Borden Converts

SHAKER-TYPE packages made entirely of fiberboard, paperboard boxes to replace wood, and a new package of wax-coated cellophane have been adopted by the Borden Co. to meet current packaging restrictions. The 3-oz. package for cream cheese, formerly wrapped in foil, is now a transparent heat-sealed wrap made by Menasha Products Co. Six of the 3-oz. packages come in a heavy paperboard carton designed by Ohio Boxboard Co., Ritmond, Ohio, to substitute for the wood cartons in use before the war.

Borden's grated cheeses, which formerly were packaged in metal shakers, are now marketed in cylindrical fiberboard shakers, manufactured by Cleveland Container Corp. The company's 6-oz. wedge-cut cheese is packaged in a triangular pouch similar to the cream cheese wrap, also made by Menasha. A special wax-coated cellophane made by General Felt Products Co. replaces the rubber hydrochloride base and foil wraps used for ¼-, 2- and 5-lb. process cheese. The ½-lb. American process cheese illustrated at the right is then packed in a paperboard carton with a patriotic red, white and blue overwrap.

Beverage Base

COLA drinks for home use can be prepared with no trouble by using "Mavis Cola Sirup," a concentrate made by Rodriguez Flavoring Sirups, Inc., Baltimore, Md. Ingredients of the beverage sirup are sugar, water, phosphoric and citric acid, caffeine extractives from kola nuts and other flavoring materials, colored with caramel. One ounce of Mavis Cola Sirup plus 5 oz. of plain or carbonated water and plenty of cracked ice makes a refreshing drink.

Mexican Pepeetas

PUMPKIN seeds have long been a delicacy in Europe and Mexico, eaten in place of nuts or candy. Only recently have they been introduced to American consumers on a large scale. "Mexican Pepeetas," roasted and salted pumpkin kernels packed by Vendome, New York, N. Y., are among the best this department has sampled.

PERFECTION IS MEASURED IN 1/1000THS

. . . when this man makes molds for glassware

MEET HARRY HULSON. He has had over twelve years' experience in operating a duplicating machine in an Armstrong mold shop. With it, he copies every contour of a master mold so that the complete set of molds is accurate to within three thousandths of an inch.

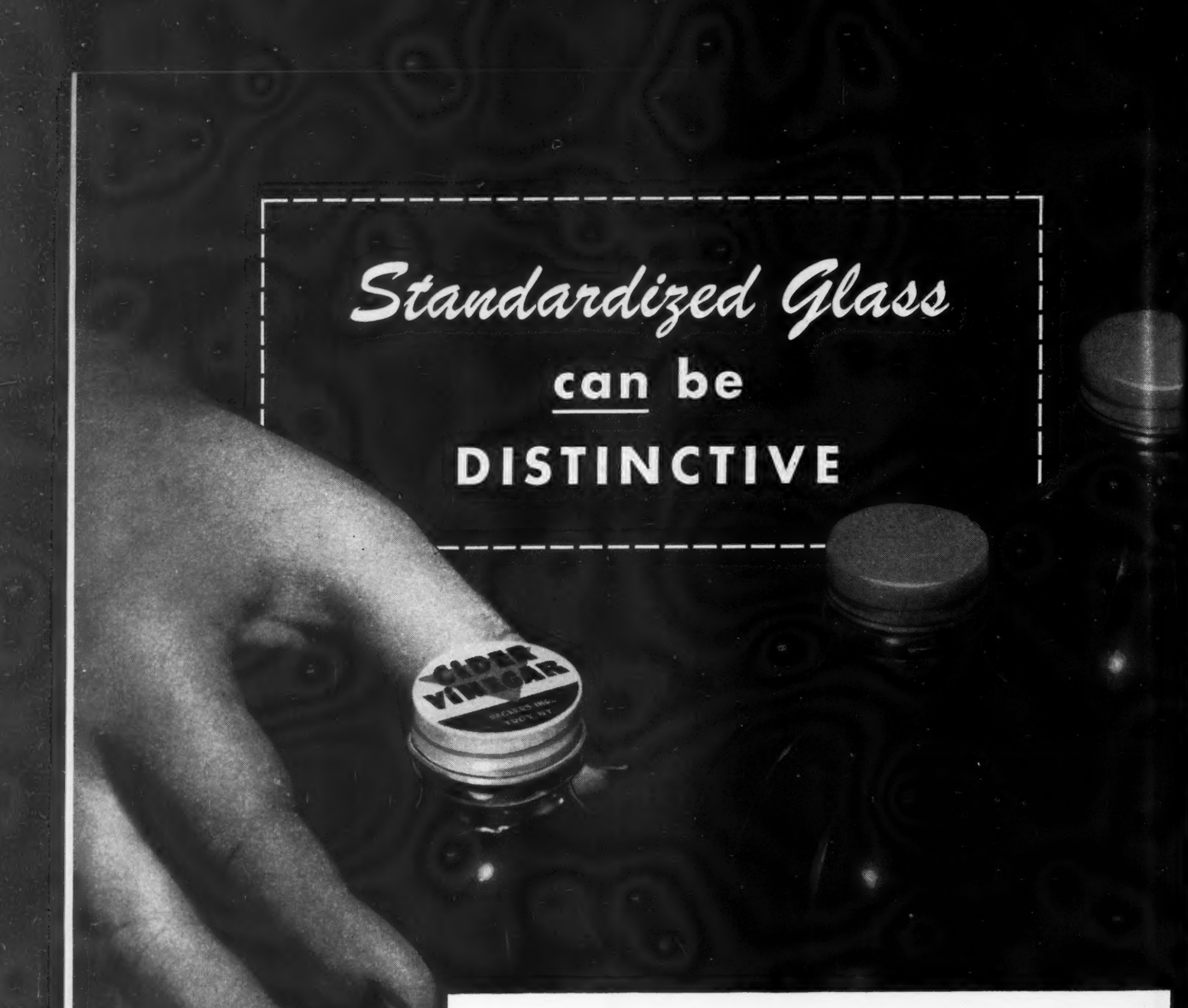
Much of the quality of any glassware depends upon the molds in which it is blown. Harry Hulson knows this perfectly, and he takes pride in the fact that his experience and skill help keep Armstrong's Glass the top-quality glass.

This spirit of fine craftsmanship among the men and women in Armstrong's plants assures you that Armstrong's Glass Packages are consistently fine of finish, strong, accurate in size, shape, and capacity.

For the interesting story of Armstrong's Glass and the men and women who make it, write for a copy of the new, free booklet, "Men and Glass." Armstrong Cork Company, Glass and Closure Division, 4205 Prince St., Lancaster, Pa., Glass Plants at Millville, N. J., and Dunkirk, Ind.

ARMSTRONG'S GLASS

and ARMSTRONG'S CLOSURES



NOW, with wartime standardization a reality, your glass packages need every bit of distinction and style you can give them.

And your standardized packages will stand out from the others if you give them the extra color and style of lithographed metal caps made by Armstrong—headquarters for glass packages for foods.

Lithographed Armstrong's Metal Caps offer you an effective, economical means of keeping your name or trade-mark alive for the duration—and afterwards, while giving you dependable sealing.

For cap design suggestions without obligation, just send us your wartime package. We'll return it with new sales appeal.

* * *

Armstrong's research laboratories are at work every minute developing new ways to overcome material shortages, both today's and tomorrow's.

If you have any wartime glass container or closure problem, perhaps we can help you. Armstrong Cork Company, Glass and Closure Division, 4205 Prince Street, Lancaster, Pennsylvania.

The Army-Navy "E" Flag flies over Armstrong's Lancaster Closure and Floor Division Plants, an award to the employees for excellence in the production of cartridge cases, shells, aircraft parts, camouflage, etc.

ARMSTRONG'S CLOSURES

Turn standard containers into standout packages

Something for the Boys

ARMY Ration K now carries coffee in small aluminum-foil packets, coated with a thin film of thermal plastic. Each contains five grams of coffee concentrate—enough for two large cups.

The coffee is furnished to Miles Laboratories, Inc., Elkhart, Ind., in powdered form and then converted by the company into tablets. The tablets are inserted in the foil packages and are run through a crushing machine which reduces the tablets to powder. Miles Laboratories are responsible for filling and sealing the packets, made

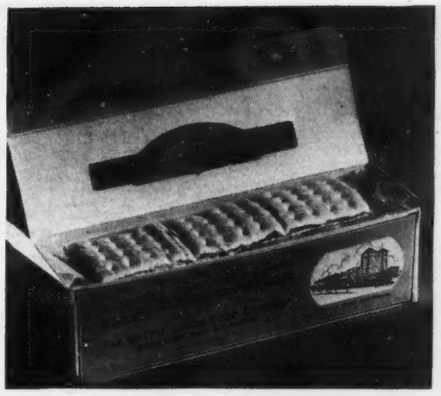
by The Aluminum Co. of America. Light and moisture will not penetrate the package, and it is not affected by extreme heat or cold. The foil protects against change, spilling or outside contamination, while the plastic coatings, inside and out, serve to heat-seal the packet and protect it against rough handling.

Chocolate Booster

DOMESTIC CONCENTRATES, INC., New York, N. Y., is offering "D. C. Booster" in commercial quantities to help solve cocoa, chocolate and chocolate sirup problems. The product is said to reduce by one-half the amount of cocoa, chocolate and chocolate liquor required in formulas, with the retention of the full flavor potency. According to the company, its product raises the performance level of cocoa and chocolate and exercises a mellowing and enrichening effect. It can be added at almost any time during the process to chocolate sirup, baked goods, ice creams and dry powder products, and may be used in chocolate-flavored milk drinks.

New Window Carton

MOST recent window carton package has been adopted by Battle Creek Food Co., Battle Creek, Mich., for its fruit crackers. The crackers are wrapped in a heavy waxed paper within the carton, topped by three sample crackers placed lengthwise so they can be seen through the open "window" in the lid of the package, which is completely sealed



with moisture-proof cellophane. Raisins, flour, sugar, shortening, salt, leavening, milk and flavoring are ingredients of the fruit crackers.

It's a Honey

"ORANGE BLOSSOM" honey is put up by C. S. Taylor & Co., Davenport, Fla., in a distinctive glass reuse container with a plastic "Dripcut" serving cap. The glass container is tapered in three curved sections and sealed with a wax-coated paper disk held in place by the

cap. The metal slide in the "Dripcut" cap that releases and cuts off the flow of honey can be removed and cleaned. The container is an attractive reuse server for sirup, milk, salad oil, batter or beverages.

"Apple Koffy"

"APPLETINE FRUIT KOFFY" is the inspiration of a Canadian firm, Appletine Fruit Products Ltd., Vernon, B. C., which is marketing the new family drink made from dehydrated apples, entirely free from caffeine, starch or other stimulants. Procedure for making the Fruit Koffy is exactly the same as is used for making coffee, by percolation, drip or boiling methods. A paperboard carton with a heat-sealed Pliofilm liner keeps the project airtight.

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PACKAGING
Service

Your nearest Rossotti Packaging Man will consider it a privilege to demonstrate how the Rossotti organization can equip your products—or group of products – with it's most salable dress. Or write us at North Bergen direct for constructive, hard-hitting packaging counsel. No obligation, of course.

Rossotti
LITHOGRAPHING COMPANY, INC.
NORTH BERGEN, N. J.
SALES OFFICES IN PRINCIPAL CITIES

chicken dinner for the army *Today!*

They may be fighting in lands where the natives dine on goat meat... or where rice and cocoanuts form the standard diet ... but chicken follows the flag wherever Americans go!

It's canned chicken, of course, canned in many cases in containers made by Crown! ...The Q.M.C. specifications for those cans call for enamel- or lacquer-lined cans in three sizes.

That's the 35 oz. size as made by Crown ... and supplied to the Otoe Food Products Co. for the Omaha Cold Storage Co. that you see above... and it's one more example of the way we at Crown are doing our part to make sure our fighting men get good American "eats" wherever they may go!

CROWN CAN COMPANY, Philadelphia • New York, *Division of Crown Cork & Seal Company,* Baltimore, Maryland

★ ★ ★ ★ ★ CROWN CAN

WPB Issues L-103 Program Standardizing Glass Pack

Quota restrictions on glass pack in M-104 revised to assure full use of additional containers

THE early April announcement that Robert Dillman had left Washington to resume his duties with Libby-McNeill & Libby signified that the government glass container program was ready to go into operation. No formal statement was made, but it was evident from the WPB orders that the goal was more glass containers for both home canning and commercial operations and a better distribution of the available supply. Tin cans to supply army requirements and for Lend-Lease shipment can be secured without trouble by canners. Glass-packed fruits and vegetables will be used to supply civilian consumer demand.

Last year when the canners came to Washington to explain why they could not convert to glass some of them must have convinced themselves that their contention was correct. But the wiser heads went home and converted a few lines just the same, resulting in a demand for glass this year which exceeded production capacity. There is no shortage of materials for making glass. Even soda ash is available in amounts sufficient to meet demands, without much to spare, however. There is a shortage of machinery to make glass. The problem that confronted the authorities was not one of forcing further conversions but rather providing glass containers for the existing capacity of food processors. This will account for the fact that no special provision was made for additional retorts and other equipment that would be needed if further "wholesale" conversion from tin to glass was the aim.

First of the War Production Board orders, an amendment to order L-103, prescribed standardization and simplification of glass containers for the packaging of 21 additional food products in place of the three commercial food products, preserves, fruit butter and jelly, for which containers had been standardized previously. About 90 standard glass containers were provided to take the place of several thousand designs, which is expected to enable existing equipment to produce about 20 percent more glass containers than were made in 1941. By providing for a shallow cap instead of the deep screw cap, a saving of about 30 percent will be realized in the amount of steel tin, liner and lacquer used formerly.

The prescribed containers are small, plain, round glass jars; plain, round, quart jars, one-half to one-gallon jars, wide-mouth pails, fruit and vegetable jars, juice jars, olive bottles, cherry bottles, shortening jars, tumblers, narrow-neck, round bottles, jugs, chili sauce bottles, and catsup bottles. The amendment also indirectly standardized the size of closures for standard glass containers.

The food products for which such containers are standardized follow:

- Salad dressings (including products using salad dressing as a base)
- Olive oil
- Edible oils other than olive oil
- Shortenings
- Maple sirup
- Chocolate sirup
- Sirups, including blended, bottlers cane, corn molasses, sorghum, malt and fountain sirups.
- Tomato catsup
- Chili sauce and cocktail sauce
- Tomato paste
- Tomato pulp (puree)
- Vinegar
- Fruits and vegetables and mixtures, including ripe olives, but excluding cranberries and maraschino cherries
- Honey
- Pickles and relishes
- Peanut butter
- Fruit and vegetable juices and mixtures
- Olives, green
- Maraschino cherries
- Cranberries and cranberry sauce
- Pectin, liquid

In spite of possible statements to the contrary the deadline for the glass manufacturers is July 4. Beginning on that date they may make only glass jars, pails, bottles, tumblers, and jugs of the standard sizes for use in packing the 21 additional foods listed in the order.

The order provides a minimum sized container for each of the specified foods and smaller sizes may not be used except that any processor may use any nonstandard glass containers that were completely manufactured before July 4. The order provides that limitations of schedule C do not apply to containers having capacities of more than 140 fluid ounces and of designs that existed on May 11, 1942. Food processors who packed less than 5,000 containers per year are permitted to use up to 5,000 non-standard containers annually. The lettering and decorations permitted on the containers is completely covered in the order.

Food processors should note that notwithstanding provisions which permit the interchange of finishes a "Deep Screw Cap" finish may not be used except as specifically stated.

The next action taken by the War Production Board was to insure the full use of the glass additional containers provided by the amendment to L-103 by removing the quota restructions of Conservation Order M-104. The amendment to this order permits a large number of fruits, vegetables, meats, juices, fish, and dairy products to be packed in glass commercially in

"FOREST" OF MOLD

What mold on bread really looks like is shown by this photomicrograph. Three billion loaves of bread will be protected against mold this year by adding an inhibitor to the product, according to E. I. du Pont de Nemours & Co.

unlimited quantities during 1943 for civilian use. The order affects the use of both metal and rubber in closures and no person may use closures to pack any product except as specified in the order. The accompanying table gives the packing quotas and type of closure for foods in glass. It is from the amended order M-104.

An amendment to L-103 was issued on April 5 prohibiting the manufacture of the one-trip bottle, except for packaging beer for overseas shipment.

Big Increase Scheduled In Frozen Vegetables

QUICK FROZEN vegetable production is headed for a sharp increase this year. On the basis of present estimates by the Department of Agriculture, the pack of quick frozen vegetables will be between 240,000,000 and 260,000,000 lb., as compared with a pack of 162,000,000 lb. last year. Of this production, the government will take about 70,000,000 lb., which will leave the supply for civilian consumption at or above that available last year, when the government used only 13,000,000 lb.

To effect this increased production, the expansion of 37 quick freezing plants has been approved, while another 25 plants are expected to increase production with their existing facilities.

DAIRY MONTH POSTER

During June, which will be dairy month this year, the dairy industry will call national attention to the war-effort contributions being made by all groups associated with production, processing and distribution of dairy products. This poster will be used to emphasize the importance of the dairy farmer.

Closures and Packing Quotas for Foods in Glass

Product	1943 packing quota	Closure material indicated by X: Tin-plate	Black-plate	Rubber
VEGETABLES AND VEGETABLE PRODUCTS				
Asparagus	Unlimited	X	..	X
Beans, with or without pork	50% 1941*	X	..	X
Beans, fresh, including green, wax, lima, green soybeans, and fresh shelled beans	Unlimited	X	..	X
Beets, including pickled beets. No whole beets larger than U. S. Standard ruby (medium) to be packed	Unlimited	X	..	X
Carrots, whole carrots not to be packed	Unlimited	X	..	X
Carrots and peas (fresh, green)	Unlimited	X	..	X
Corn, fresh, sweet cut	Unlimited	X	..	X
Mixtures of vegetables (other than carrots and peas, and succotash) which consist of not less than 90 percent of any combination of vegetables listed in this schedule, (or of any such combinations and celery, onions, and peppers); provided that the combination by drained weight shall consist of not more than 60 percent of any one vegetable; and, provided further that no vegetable may be packed under this item until the packer has packed and set aside his full quota for that vegetable as established pursuant to Food Distribution Order No. 22 and orders supplementary thereto	Unlimited	X	..	X
Mushrooms	Unlimited	X	..	..
Peas, fresh green	Unlimited	X	..	X
Pimientos	50% 1942*	X	..	X
Spinach, and other green leafy vegetables limited to beet, collard, dandelion, kale, mustard, polk, and turnip greens	Unlimited	X	..	X
Succotash	Unlimited	X	..	X
Tomatoes	Unlimited	X	..	X
Tomato catsup and chili sauce, containing not less than 10.7 percent (specific gravity 1.045) by weight, dry tomato solids:				
Closures without rubber	Unlimited	X	..	..
Closures with rubber; to the extent of rubber allocated to manufacturers for this purpose prior to February 4, 1943	See product column	X	..	(1)
Tomato paste, containing not less than 25 percent, by weight, dry tomato solids	Unlimited	X	..	X
Tomato pulp or puree, containing not less than 10.7 percent (specific gravity 1.045) or more than 25 percent, by weight, dry tomato solids	Unlimited	X	..	X
Tomato sauce, including spaghetti sauce containing not less than 8.7 percent (specific gravity 1.037) by weight, dry tomato solids, and not less than 10.0 percent (specific gravity 1.042) by weight, total dry solids, salt free. In addition to salt, the contents may contain pepper, spice, oils, and other flavoring ingredients	Unlimited	X	..	X
Vegetables, dehydrated	Unlimited	..	X	..
Vegetable juices, or mixtures thereof, undiluted, except for the addition of sweetening or seasoning	Unlimited	X	..	..
NOTE.—When required for packing other products, tomato paste, tomato pulp or puree, tomato sauce, and tomato juice may be repacked from reusable cans, 5 gallons or larger.				
FRUITS				
Apples, including crabapples, whole apples not to be packed	25% 1941–42*	X	..	X
Applesauce, including sauce from crabapples	25% 1941–42*	X	..	X
Apricots	Unlimited	X	..	X
Blackberries, black raspberries, blueberries, boysenberries, dewberries, elder berries, gooseberries, loganberries, red raspberries, and young berries	Unlimited	X	..	X
Cherries, red sour pitted and sweet	Unlimited	X	..	X
Figs	Unlimited	X	..	X
Fruit cocktail, consisting of any combination of fruits listed in this Schedule I, or any such combination, and grapes and pineapple: Provided, That the combination, by drained weight, shall consist of not less than 50 percent fruits listed in this Schedule I and may consist of not to exceed 10 percent grapes. Pineapple may be repacked from No. 10 or larger cans to the extent of 7 percent of the fruit cocktail	Unlimited	X	..	X
Olives, ripe or green ripe, whole or minced	75% 1941–42*	X	..	X
Peaches, clingstone, halves, segments, or slices	Unlimited	X	..	X
Peaches, freestone, halves, segments, or slices. Not to be packed in California	Unlimited	X	..	X
Pears. Whole pears, except sickle pears, not to be packed	Unlimited	X	..	X
Plums	Unlimited	X	..	X
Prunes, fresh Italian	Unlimited	X	..	X
FRUIT PRODUCTS				
Fruits, crushed, fountain fruits	100% 1942*	..	X	..
Fruit butters, conserves, jams, jellies, marmalades, and preserves	Unlimited	X	..	X
Fruit juices or mixtures thereof, other than grapefruit juice, undiluted except for the addition of sweetening	Unlimited	X	..	X
Grapefruit juice	100% 1942*	X	..	2X
Fruit concentrates, liquid, when concentrated on a ratio of 5 or more to 1	Unlimited	X	..	X
Fruit concentrates, dry	Unlimited	..	X	..
Nectars	100% 1942*	X	..	..
Pectin, liquid	Unlimited	..	X	..
MILK AND DAIRY PRODUCTS				
Cheese spreads, processed	Unlimited	X	..	..
Cheese spreads, unprocessed (e. g. limburger)	Unlimited	X	..	..
Condensed milk, sweetened, as defined by the Federal Security Administration, July 2, 1940, paragraph 18,525, page 2444, Federal Register, and 18,530, page 2445, as amended, Federal Register, August 8, 1941, pages 3973 and 3974	100% 1942*	X	..	..
Cultured milk—"Cultured milk" as classified herein refers only to those cultured or fermented milk or skim milk products which develop pressure within the container (glass bottles) due to fermentation which is produced by the addition of certain materials to milk or skim milk such as sugar, yeast, cultures, and the like	Unlimited	..	X	..
Fluid milk, with or without flavoring. Quota: Until 9/30/43 100 per cent of corresponding period of 1941	See product column	..	X	..
Ice cream mix, dry. Notwithstanding the provisions of paragraph (d) (4) of Order M-104, packing quota includes pack required to be set aside by any order of the War Production Board, the Food Distribution Administrator, the Department of Agriculture for urchase by Government agencies	50% 1942*	X	..	X
Malted milk, including chocolate milk, dry	Unlimited	..	X	..

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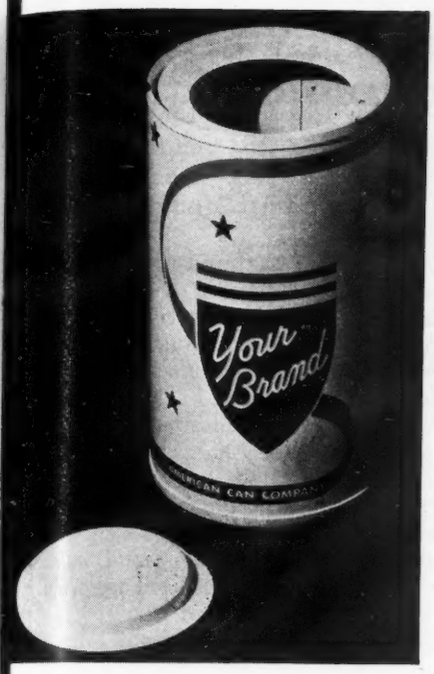


NEW ALL-FIBER CAN

Here is a new all-fiber can which is being made on metal-can-making machinery. Developed by American Can Co., it is suitable for dry food products. It is of lap-seam construction with the top and ends crimped and heat sealed to the wall. It has a thermoplastic lacquer lining which serves the double purpose of a protective inner coating and adhesive for the seam and joints.

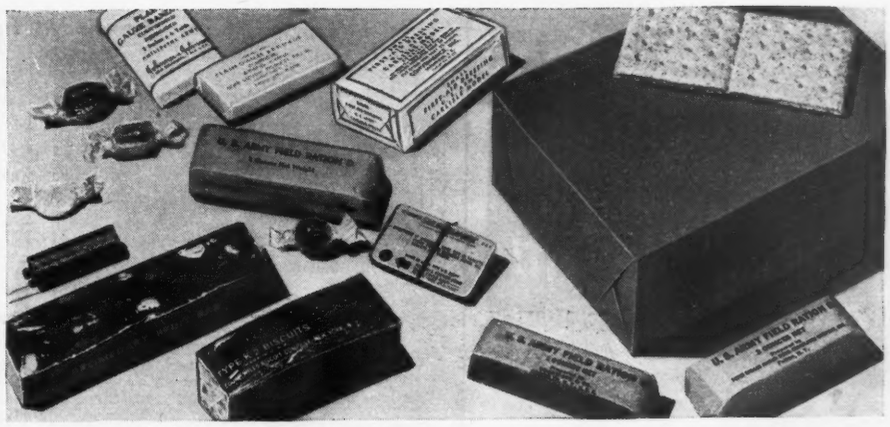
Shell Eggs in Storage Are To Be Set Aside

ALL shell eggs in cold storage on May 31 shall be set aside for governmental agencies, according to Food Distribution Order No. 40 issued late in March. The owner of eggs in storage cannot offer them to the agencies at more than the ceiling prices applicable to grades for government purchases in effect at the time they are offered.

The order also provides that after May 31 no eggs may be stored except for government uses, but it also provides that shell eggs may be released from the order by the Director of the Food Distribution Administration.

Food Distribution officials point out that storage demand has increased recently, with the result that there has been a heavy into-storage movement of shell eggs, which is beginning to affect civilian supplies.

This order is one of two steps being taken to assure proper distribution of eggs and egg products between the military, civilian and Lend-Lease requirements. Food Distribution Order No. 41, reserving spray-dried whole eggs for delivery to governmental agencies, and limiting the production of frozen or liquid eggs, dried yolks, dried albumen and dried whole eggs is another step in this direction.



NEW Wrapping Machines for WAR WORK

or Essential Civilian Supplies

We have so arranged our production, that the building of a limited number of essential wrapping machines does not interfere with our armament work . . . Also, by redesigning our machines, we have eliminated a large percentage of strategic materials formerly used.

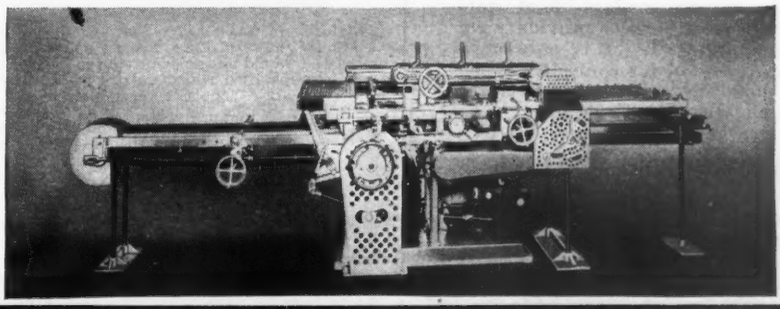
Orders for such machines must, of course, bear high priority. And under present conditions, it is advisable to consult us as far in advance as possible.

So if you need, or will need, a new wrapping machine to meet demands for essential civilian supplies or to fill government contracts, get in touch with us now. We will be glad to give you helpful information regarding priorities required and the time it will take to supply you.

PACKAGE MACHINERY COMPANY, Springfield, Mass.

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

MODEL FA—One of our models now widely used in current war production. This machine is adaptable to any wrapping material, and is quickly adjustable for various size packages.

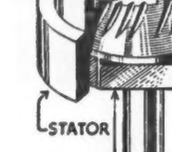


PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

Original design of rotor and stator in

EPPENBACH COLLOIDAL MILL assures more efficient triple action.



Outlines Package Supply Situation

Availability of materials and containers discussed at the Packaging Conference

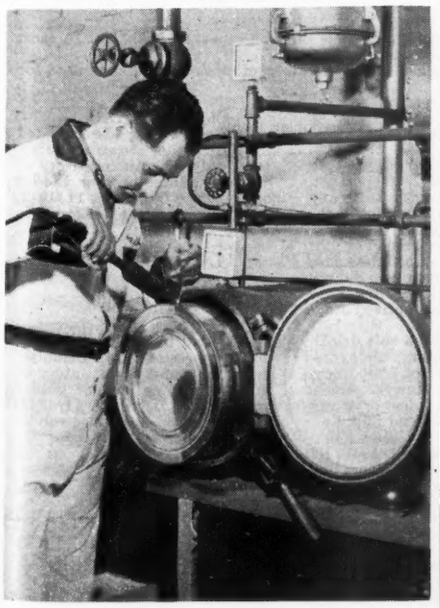
SIGNIFICANT information on the available supplies of various types of material were given by Charles L. Sheldon, of Hood Rubber Co., at the Packaging Conference and Exposition held in New York, April 13-16, under the sponsorship of American Management Association. The glass industry is about 7 percent oversold at the present time, and some food manufacturers cannot get any glass company to accept their business. There will be a tight situation in glass for the balance of the year.

In respect to fiber drums, an AA-2-X is the lowest rating that will obtain these containers at the present time. However, there is a good chance that production will improve considerably during the next four months.

The steel drum industry has plenty of capacity to take care of all permitted civilian needs, but steel drums cannot be purchased, except for a product permitted to be packaged in them under Limitation Order L-197.

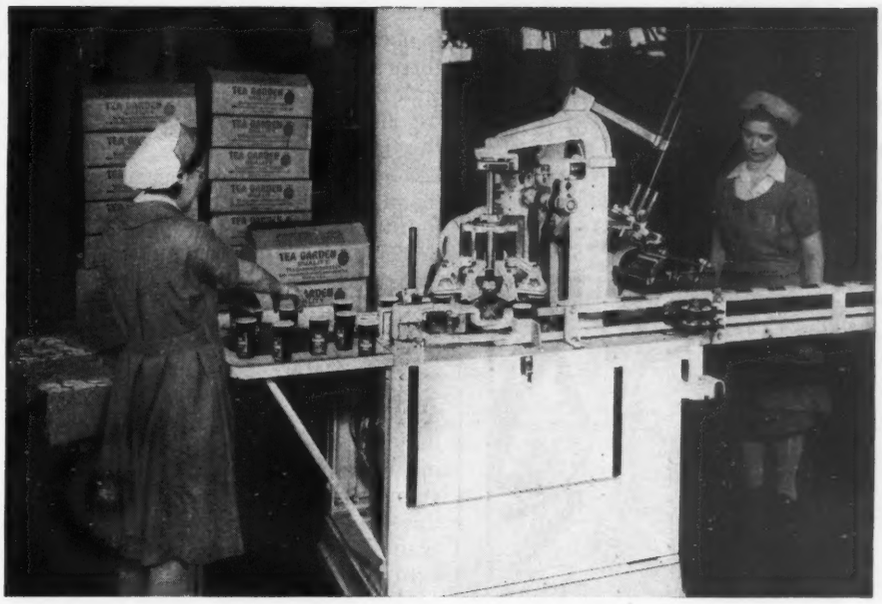
In respect to metal cans, plenty of capacity is available in the industry to take care of all uses permitted under M-81.

The multiwall paperbag industry has the capacity to manufacture at least 50 percent more than it is now making and can obtain the paper necessary to



PACKING IN INERT GAS

Elaborate facilities for vacuumizing and injecting nitrogen into rigid metal containers have been installed by Peerless Packers, Inc., New York. The picture shows one of a battery of units used for this purpose.



HOW

TEA GARDEN

PRESERVES GOOD LABELING

Here is the recipe. Take all shapes and sizes of TEA GARDEN jars and bottles and put them through a WORLD Automatic UNI-TURRET Labeler as shown above. It adds clean, accurately positioned, firmly affixed labels. Its tested and proved ingredients include compact, efficient, sturdy construction and smooth, swift, dependable operation day in and day out. It *preserves* good labeling and *conserves* time, labor and money.

"The proof of the pudding is in the eating". Those now using WORLD Automatic and Semi-Automatic Labelers provide the most authoritative basis for preserving your confidence in the fact that you will continue to get "the *best* labelers in the WORLD."

Some of the many famous TEA GARDEN products labeled by the WORLD Uni-Turret. Note the wide variety of container and label sizes and shapes.

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

Worcester, Massachusetts

NEW YORK PHILADELPHIA PITTSBURGH CHICAGO SAN FRANCISCO DENVER LOUISVILLE
SALT LAKE CITY EL PASO SEATTLE PORTLAND LONDON MONTREAL TORONTO WINNIPEG
SPOKANE VANCOUVER SYDNEY, AUSTRALIA WELLINGTON, N. Z. SAN JUAN, P. R.

The
DRUG STORE BEETLE

The Drug Store Bettle devours nearly all kinds of foodstuffs as well as drugs. Popular belief says it will eat "anything except cast iron and glass bottles." And the female lays its eggs in almost any dry organic substance.

FUMIGATE

One material this beetle and its progeny can't stomach is HCN gas, properly applied. This is equally true of other insect and rodent pests. Call on your local Pest Control Operator for a well planned fumigation program.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington, Delaware.

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REG. U.S. PAT. OFF.
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AN ECONOMICAL SOURCE
OF HCN FUMIGATING GAS

W. P. O. No. 1623

meet increased demands. The situation is not so fortunate with textile bags as there appears to be a deficit of several hundred million yards of textile bag material between the supplies and the demand.

There is plenty of capacity for the manufacture of tight cooperage as the industry is operating at only about 50 percent. But the manufacturers are having difficulty in obtaining staves. This condition may be corrected shortly so that all demands can easily be taken care of.

There are insufficient lumber supplies to enable the nailed wooden box industry to operate at capacity. The manufacturers of wire-bound boxes are operating at only 50 percent capacity, due to a shortage of veneer. Wire-bound boxes are obtainable only on extremely high ratings, and many users of this type of container on domestic shipments will be forced to other types of packaging.

In regard to corrugated and solid fibre containers, there is some disagreement about the supply situation, but Mr. Sheldon believes that before the end of this year there will be shipping containers for everybody.

Certain grades of protective papers needed to make tight and moisture-proof cartons are scarce. Paper can demands are far ahead of production, but new facilities will give some relief in the next sixty to ninety days, and this also applies to fiber cans.

Grade Labeling Issue Debated

OPA factions split on mandatory grade labeling; 1943 pack labeling seen in doubt

CONSIDERABLE confusion still surrounds the grade labeling issue, with pressure groups plugging both sides of the question and OPA a house divided. Within OPA officials are lining up behind either Deputy Price Administrator J. K. Galbraith, an old-line Henderson man who favors mandatory grade labeling, or Deputy Administrator in Charge of

(*Continued from page 86*)

Product	1943 packing quota	Closure material[1] indicated by X: Tin-plate	Black-plate	Rubber
Nut butters	Unlimited	..	X	..
Soups, dehydrated	Unlimited	..	X	..
Spice, and seasoning	100% 1942	X	..	..
Vinegars	Unlimited	X	..	..
Special food products, for human consumption only, limited to foods other than usual table foods. Quota: No person shall pack any special food product unless he packed the product in substantially the same form in 1942, and unless he obtains prior permission upon application to the War Production Board	(3)	(1)	(1)	(1)

[1] During 1943 only.
[2] Until Mar. 31, 1943.
[3] See product column.

NOTE.—When required for the packing of other products, pineapple may be repacked from No. 10 cans. Grape juice may be repacked from reusable cans, 5 gallons or larger.

* Whenever the asterisk appears the packing quota relates to the number of closures and cans used for packing the applicable product.

BEVERAGE CLOSURES

Product—Bottling quota	Closure material
Product: Malt beverages, including only beer, ale, porter near-beer, and mixtures thereof. Quota: Any person who produced in 1941 less than 65,000 barrels may use in any calendar month, commencing with December 1, 1942, 100 percent, and any person who produced in 1941 over 65,000 barrels may use in any calendar month, commencing with December 1, 1942, 70 percent of the number of closures affixed by him to glass containers during the corresponding month of 1941. In the case of a person who packed all or part of his 1941 production in cans, each such can may be counted as a closure affixed to a glass container. In the case of a person who did not produce any malt beverages in 1941, such beverages bottled by him, shall be considered as having been produced by him, and his authorized usage of closures shall be calculated accordingly.	Tinplate and blackplate allocated for purposes of crown manufacture, only, and in inventory of crown manufacturer or bottler on or before December 11, 1942. Also rejects and electrolytic waste-waste.
Product: Non-alcoholic beverages, including only carbonated soft drinks; non-carbonated soft drinks; unflavored carbonated waters; unflavored naturally carbonated and still waters; drinks consisting of fruit juices, vegetable juices, and combinations thereof, where less than 85 percent by weight of such drinks is pure fruit juice, vegetable juice, or a mixture thereof; and sterilized milk drinks made with powdered milk. Quota: Any person who used in 1941 less than 5,000 gross of closures, may use during any calendar quarter, commencing with October 1, 1942, 100 percent of the number of closures affixed by him to glass containers during the corresponding quarter of 1941. Any person who used in 1941 more than 5,000 and less than 7,000 gross of closures, may use not to exceed 5,000 gross of closures in any twelve-month period, commencing with October 1, 1942; the number used during any calendar quarter to be at the same proportionate rate he affixed closures to glass containers during the corresponding quarter of 1941. Any person who used in 1941 more than 7,000 gross of closures, may use during any calendar quarter, commencing with October 1, 1942, 70 percent of the number of closures affixed by him to glass containers during the corresponding quarter of 1941.	Tinplate and blackplate allocated for purposes of crown manufacture only, and in inventory of crown manufacturer or bottler on or before December 11, 1942. Also rejects and electrolytic waste-waste.

(1) No person, other than a jobber purchasing for resale, shall accept delivery of malt beverage or non-alcoholic beverage closures which would increase his inventory beyond 20 percent of the number of such closures and cans which he used in 1941 for packing malt beverages and non-alcoholic beverages.

(2) Closures for waters. Except with regard to items listed in Schedule II, no closures made of tinplate, terneplate, or blackplate shall be affixed to glass containers smaller than 12 fluid ounces, for packing unflavored carbonated, natural or mineral waters, unless such glass containers were manufactured on or before June 1, 1942.

(3) All persons who bottle malt beverages or non-alcoholic beverages, shall report upon Form PD-519 to the Containers Division, War Production Board, Washington, D. C.

Information, Lou R. Maxon, who has come out against the regulation. Although the House Agricultural Committee on April 7 voted unanimously against grade labeling of the 1943 pack of canned fruits and vegetables, on the same day OPA extended its mandatory grade labeling program to include canned snap beans. Grade labeling has previously been ordered for canned grapefruit juice, peas, corn and tomatoes.

Following the congressional hearing, consumer, labor and women's organizations proposed to Price Administrator Brown that either he go through with his announced program to require grade labeling for all canned goods, or that he establish one standard price at the "standard" or Grade C level for each canned product. If this plan is adopted, only canned goods which carry Grade A or Grade B labels would be permitted to sell at higher than standard prices. The proposal was sent to Brown after the House committee voted to recommend to Brown that if grade labeling would reduce the size of the pack then it be not required on the 1943 pack.

The unions are the latest group to support the Galbraith faction, with William Green, President of the A. F. of L., calling on Price Administrator Prentiss Brown to carry through his original program. Industry and canning interests are opposing the regulation on the grounds that it will cause price confusion, and the Label Manufacturers' National Association is opposing OPA's plans, claiming that most of the labels for 1943 use are already in the hands of the packers and there would not be time to have them returned and changed in time to be used this year. However, Washington observers believe that when the smoke clears, Prentiss Brown will indorse the mandatory grade labeling principle.

Dr. Prescott Wins Appert Medal Award

IN RECOGNITION of his services to the advancement of food technology, Dr. Samuel Cate Prescott will receive the Nicholas Appert Medal of the Institute of Food Technologists at the Institute's annual banquet, June 3, in the Statler Hotel, St. Louis. Since his retirement as dean of science at Massachusetts Institute of Technology, Dr. Prescott has been serving as consultant to the dehydration committee of the U. S. Department of Agriculture and to the research laboratories of National Canners Association.

In making the award this year the Institute is honoring Dr. Prescott for a lifetime of research and experiment in the food field.

CORK Insulation Is Available Now

WITHOUT PRIORITY

REMOVAL of priority restrictions on the sale of Mundet Cork Insulation now makes this unsurpassed insulating material available for all low-temperature uses. ¶ This action is good news for refrigeration engineers and operators. Cork's pre-eminence in meeting war needs has been fully recognized. Now that sufficient stocks of raw cork have been accumulated to assure these vital uses, and with fresh shipments arriving regularly, Mundet Cork Insulation is once more available for commercial applications. ¶ The qualities in Mundet Cork Insulation that caused it to be specified for important war projects recommend it also wherever low temperature must be controlled and conserved most economically. Mundet Cork Corporation, Insulation Division, 65 South Eleventh Street, Brooklyn, N. Y.

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CONSERVES LOW TEMPERATURE

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for every type of food

We have them all . . . cellophane; glassines, opaque to super transparent; papers . . . in all types of laminations and combinations . . . with and without heat-sealing features and thermoplastic coatings . . . bags, envelopes, sheets, with and without cartons . . . for packaging to government specifications or for essential civilian uses.

Describe your packaging need, and we'll send samples of *all* packagings suited to your purpose. Mention quantity used and we can quote prices, too. And, if you're developing a new package, we'll be glad to test or help you test and compare materials. (No obligation —for any service.)

P. S. PACKERS OF DEHYDRATED FOODS will find here every known type of paper packaging for dehydrated foods . . . each carefully tested and proved equal to, or superior to any other leading packages. Consequently, consultation with us is quick way to compare the merits of all the best dehydrated foods packagings on the market . . . will save you much "shopping" time. And, you are assured of unbiased recommendations and our wholehearted, friendly cooperation in determining the best package for your product and purse.

"Specialist in Special-Purpose Paper Packagings" . . .

Packaging Division
E. W. TWITCHELL Inc.
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OPA Price Regulations

Fluid Milk—Amendment 3 to MPR 329, released April 8, extended indefinitely the nationwide emergency ceiling placed February 13 on prices which fluid milk distributors and handlers might pay to farmers for milk for resale as fluid milk. Prices are frozen at the highest January, 1943, level.

Spinach; Grapefruit Juice—The 1943 pack of spinach was brought under specific dollars-and-cents maximum prices per dozen cans by OPA at levels which prevailed for the 1942 pack in Amendment 7 to MPR 306, issued April 12. At the same time, OPA set specific dollars-and-cents maximum prices for grapefruit juice packed in glass. In January, 1943, OPA established ceiling prices for grapefruit juice in glass. The prices in the present amendment are on the same basis adjusted for glass pack.

Tunafish—Launching a price control program on fresh fish for the first time in a further measure designed to halt the rising cost-of-living, Prentiss Brown on April 13 placed ceilings on four species of tuna and two tuna-like species when sold by fishermen. Effective April 19, 1943, the new ceilings for fresh tuna approximate present levels for yellowfin, bluefin, skipjack, yellowtail and bonito.

Bread Crumbs—Because under the original order on bread crumbs, many producers' ceilings, after packaging and transportation costs have been tacked onto the base maximums, were the same as the retailers' ceiling, OPA on April 13 issued an order allowing retailers to add packaging or transportation costs to their maximum prices to permit them a fair margin. Effective April 19, the new Amendment 158 to Supplementary Price Regulation 14, GMPR, clarifies the original intent of the order.

Canned Snap Beans—OPA on April 7 established specific dollars-and-cents maximum prices per dozen cans for canned snap beans at levels approximately those of 1942. The Amendment 6 to MPR 306, effective April 7, provides there will be no increase in the price of canned snap beans at retail. Both wholesale and retail prices for the commodity are figured on a fixed mark-up basis.

Cheese—Amendment 19 to MPR 280 provides that sellers of cheese, with certain exceptions, may add 3 cents per pound to the maximum price. This 3-cent increase may not be applied to those stocks of cheeses which were in the sellers's possession prior to Feb. 10, 1943. However a cheese factory may apply this increase to cheeses which it has manufactured and delivers on or after Feb. 10, 1943, regardless of whether such cheeses were manufactured before or after that date.

Dairy Products—Amendments 8, 10 and 11 to MPR 289, issued April 2, revise ceiling prices for industrial casein, cheddar cheese and bulk butter. Maximum prices for wet curd acid-casein, wet curd rennet-casein, dry acid-casein, dry rennet-casein and whey powder are reestablished in Amendment 8. A ceiling price is fixed for cheddar cheese sold in the state of Wisconsin, and for cheese sold outside the state, in Amendment 10. Amendment 11 to the original order sets a series of maximum prices for different grades of bulk or unprinted butter in different locales of the country.

Processed Food Commodities—Order 375 under 1499.3 of GMPR sets forth a pricing formula for processed food commodities subject to GMPR and establishes a mark-up system for the commodities. The order requires a producer to report his maximum prices to OPA within 10 days after determining them in accordance with the revisions.

Eastern and Gulf Oysters—OPA on March 23 lifted the canner ceilings on canned eastern and Gulf oysters 20 cents per dozen cans on the No. 1 picnic size and 45 cents per dozen cans on the larger No. 2 picnic size. The canner pricing change, when supplemented by fixed mark-ups at wholesale and retail, will result in an increase of approximately two cents per can to the housewife.

Meats and Fats Rationing—Foods rationed under the new meats and fats program beginning March 29 will be available to industrial users in 1943 in amounts approximating 70 percent of the total poundage used by them in corresponding periods of 1942. The new meats and fats rationing regulations (Ration Order 16) provide for point allotments to industrial users during quarterly allotment periods, the first being the April-May-June period.

Soybeans—Choice soybeans specially cleaned for use in the production of food products not involving the extraction of soybean oil were exempted from price control on March 26, in amendment 2 to MPR 331. The order will affect such products as salted soybeans.

Canned Turkey Meat—To encourage production of canned turkey meat for military needs, OPA on March 25 issued amendment 1 to MPR 269 authorizing turkey canneries producing for the United States and buying turkeys on an f.o.b. basis to pay prices established for the sellers' shipping point. The new amendment should facilitate movement of turkey stocks in storage in Utah, Oregon and Washington to the large midwestern canneries.

Sirups and Molasses—Packers of sirups and molasses, who previously paid premiums over existing market prices for certain items among these commodities because of special quality or flavor were authorized in Amendment 4 to MPR 291 to apply for permission to continue paying these premiums, with the understanding that the extra cost would not be allowed to be reflected in the packer's selling price.

Dried, Dehydrated Fruits—All dried and dehydrated fruits were temporarily removed from rationing, and point values of all fruit

and vegetable juices and dehydrated soups were lowered sharply in the first revision of point values under OPA's rationing program, effective March 29. The new order raises from March levels the point values of applesauce, peaches, pineapple, canned fresh lima beans and other items.

Canned **Meat**—Producers of canned meats who were pressed for storage space to hold stocks accumulated during the recent freeze on sales have benefited from amendment 2 to Restriction Order 3, announced March 19, permitting any person to make limited transfers to wholesalers. Transfers are limited in quantity to 50 percent by weight of the total of any person's canned meat inventory at the close of business on Feb. 17, and 50 percent by weight of stocks produced or acquired by him since that date.

Packers' **Tin Cans**—**OPA** on March 26 issued MPR 350 to avert increased consumer costs of commercially processed foods by fixing producers' ceiling prices of packers' tin cans at levels that have prevailed in general for the past three years. Maximum prices for wide-mouth glass containers will be issued soon.

Packaged **Skim Milk**—Amendment 9 to MPR 229, effective April 12, sets maximum price ceilings on packaged skim milk at the packer level. Packers, with high price ceilings on packaged skim milk during the Sept. 28- Oct. 2, 1942, base period of individual price freeze, will find their new maximums cut back approximately 7 cents to 16 cents per dozen packages. Four zones are set up for packaged skim milk in the new order.

Canned **Corn**—A new table for computing the price ceilings on grades of canned corn was issued on March 31 in amendment 5 to MPR 306. In the same order new regions were designated for fixing price ceilings for the product.

Frozen **Fish and Seafood**—Maximum prices were established on April 7 for frozen fish and seafood, in MPR 364. A complete table appended to the order includes a formula for determining processors' and wholesalers' ceiling prices for all varieties of frozen fish.

Packaged **Honey**—Specific cents-per-pound maximum prices for packaged honey were established on March 29 in Amendment 4 to MPR 275, establishing an alternative pricing method for packers. The new alternative is set on a basic maximum price of 21 cents for a 1-lb. package sold to a wholesaler. At the same time it was announced that sales of packaged honey at wholesale and retail would be placed under mark-up restrictions.

Canned **Boned Turkey**—According to amendment 7 to MPR 269, issued March 25, when any person sells a turkey item to a purchaser who cans boned turkey meat for sale to the government, he may sell at his maximum base price f.o.b. his shipping point without subtracting his "freight rate" from the place where the shipment begins to the place where the shipment ends.

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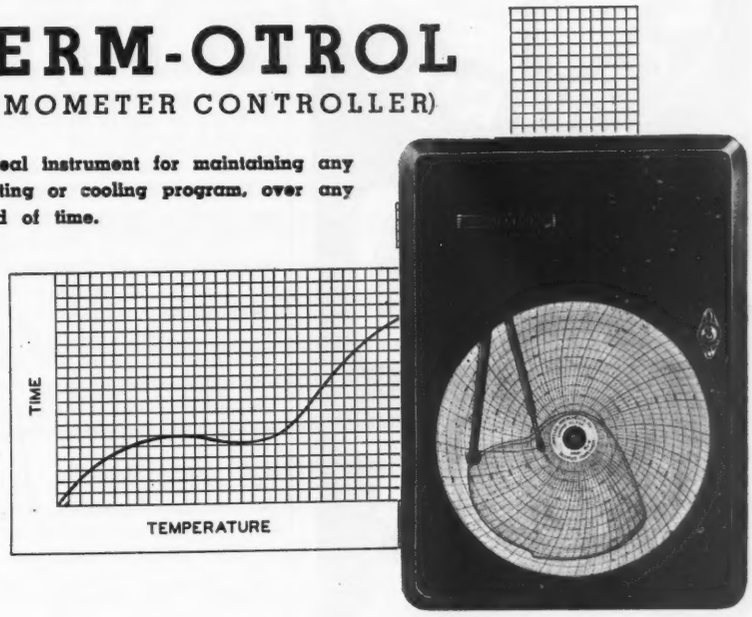
CHRON-OTROL

(TIME CONTROL)

THERM-OTROL

(THERMOMETER CONTROLLER)

—as the ideal instrument for maintaining any desired heating or cooling program, over any given period of time.



The combination of Wheelco's famous "Electronic Principle" Therm-otrols (Thermometer Temperature Controllers) with Chron-otrols (Time Controllers) provide the simplest, most logical means of enforcing any temperature-time cycle required in your processing operations.

Temperature-time control is effected by means of a rotating disc (driven by a synchronous motor or clock movement), which is so contoured as to change the position of the temperature control setting arm. Position of the setting arm determines the control point and produces the desired control sequence.

Chron-otrol—Therm-otrols are available as Recording (as shown above) or Indicating Controllers. Many models may be combined with Flame-otrols (combustion safety controls), Proportioning Controls, or Purging Timers.

Scale ranges from —70 to +1000° F., or equivalent °C.

Write for your copy of new free Bulletins which describe these controllers.

NOTE: Chron-otrol Temperature Controllers are available for temperatures as low as —300° F., or as high as 3600° F., or their Centigrade equivalents. Write for free literature.

Wheelco Instruments Co.

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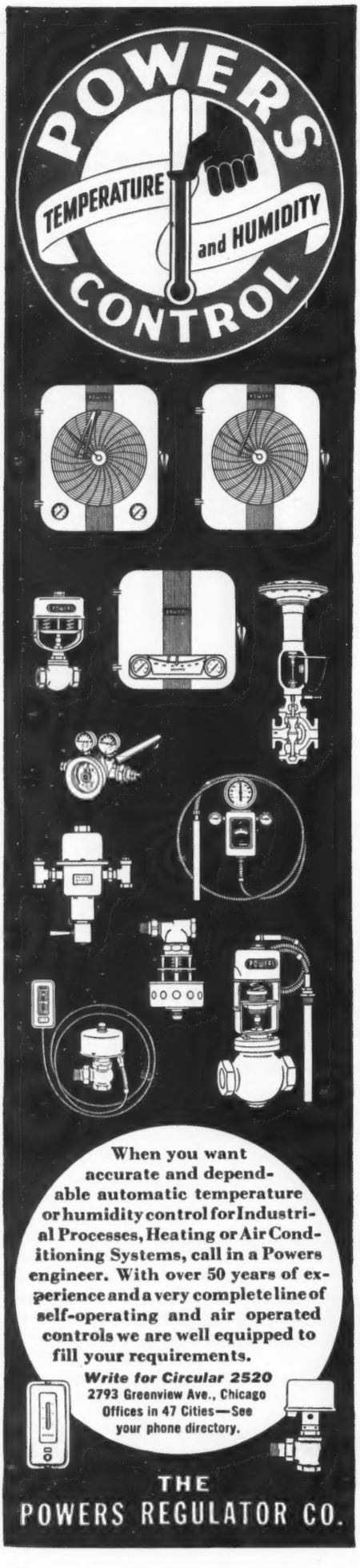
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When you want accurate and dependable automatic temperature or humidity control for Industrial Processes, Heating or Air Conditioning Systems, call in a Powers engineer. With over 50 years of experience and a very complete line of self-operating and air operated controls we are well equipped to fill your requirements.
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THE
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Food Administration Orders

Shell Eggs, Dried Whole Eggs—FDO 40, released March 22, restricts the sale and storage of shell eggs after May 31, 1943, according to specified quotas, to assure a sufficient supply for military needs. FDO 41, issued March 23, reserves the entire 1943 production of spray-process dried whole eggs for delivery to government agencies. The order also limits production of frozen and liquid eggs, dried yolks, dried albumen and pan-dried whole eggs to the quantities produced and sold for commercial use in the country in 1942.

Fats and Oils—To assure an adequate supply of fats and oils to meet war and essential civilian needs, the Food Administration on March 31 issued FDO 42 limiting manufacturers to the use of fats and oils in a direct percentage to their use of these products in corresponding quarters of 1940 and 1941. If a manufacturer does not use all of his quota during the allotted quarter he may carry the balance forward and add it to his permitted quota for the next quarter.

Fish and Shellfish—On April 1 the Food Administration placed restrictions on the sale of specified canned fish and shellfish, in FDO 44. The order sets quotas for the sale of each canner's pack of salmon, pilchard, sea herring, mackerel, horse mackerel, shrimp, tuna, yellowtail and bonito, and restricts percentages of canned fish that may be packed between April 1, 1943 to Feb. 29, 1944.

Beans and Peas—Each processor of beans must set aside at least 55 percent of all of his supply during each calendar month for delivery to a government agency, according to FDO 45 issued April 1. Processors and owners of peas and split peas must set aside for government purchase 60 percent of their total supply in each calendar month.

Cocoanut, Babassu and Plam Kernel Oils—Further regulations on the use of these oils went into effect on April 1 when FDO 46 was issued requiring each processor to set aside 25 percent of his total supply for government agencies.

Honey—Transfer of authority to regulate the amount of honey used in the manufacture of food products was accomplished in FDO 47, superseding the WPB regulations. During the 3-month period ending June 30, 1943, and during each subsequent 3-month period, no firm or individual may use in manufacturing other products more than 600 lb. or 120 percent of the quantity of honey so used by him in the corresponding period of 1941, whichever is greater.

Transfer of Administration—FDO Orders 31–39 inclusive represent transfer of authority to administer regulations from WPB to the Food Administration, on cacahuananche oil, castor oil, glycerine, palm oil, cashew nut oil, sperm oil, rapeseed oil, mustard oil and tung oil. Only minor revisions were made in the orders after authority was transferred.

Tea—Quotas for packers and wholesale receivers of tea for the second quarter of

COCA-COLA GETS "E" AWARD

Coca-Cola Co.'s munitions subsidiary, The Brecon Loading Co., Talladega, Ala., which operates the Coosa River ordnance plant, has received the Army-Navy "E" award for excellence in the production of vital war materials. From left to right are Col. T. C. Gerber of the War Department; Lois Turner; W. N. Cochran, vice-president of Coca-Cola Co. and general manager of Brecon Loading Co.; Sarah Wilcox; and Lt.-Comm. E. S. Brown, naval inspector.

1943 were announced on March 24 by the Department of Agriculture. On the same day, FDO 18.2 was amended, making certain changes in computing quotas, to make tea available for distribution to civilian consumers on approximately the same basis as in previous months.

Raisin-variety Grapes—To meet military, civilian and Lend-Lease needs, the Food Administration on April 6 revised FDO 17 to provide that all raisin-variety grapes produced in eight California counties, except those covered by canning contracts approved by the Administration, be diverted into raisins.

Slaughter Permits—The Department of Agriculture on April 2 announced amendment 1 to FDO 27, authorizing U.S.D.A. War Boards to grant slaughter permits and temporary quotas to butchers who do not have 1941 slaughter bases, but are otherwise qualified to receive permits.

Spices—Amendment 1 to FDO 19, issued April 2, establishes new quotas for restricted spices according to the corresponding quarterly period of 1941 or other accepted base period. Restricted spices include black pepper, cassia, cloves, ginger, mace, nutmeg, pimento and white pepper.

Food Directives—The Secretary of Agriculture on March 20 issued the formal directives to OPA to ration meats, edible fats and oils including butter, and cheese, as authorized on March 11. The directive to ration canned fish was issued earlier in the month. Food Directive 6 includes all cheese and fats and oils, although only the hard, cured cheeses and the edible fats and oils previously announced are now rationed. Olive oil and soft cheeses are not rationed. Food Directive 7 applies to meats as listed in the March 11 announcement. Food Directive 5 which relates to rationing processed foods was amended on March 20, and revocation of Food Directive 1 was announced on the same day. On March 17 Food Directive 2 was amended to define more specifically the responsibilities delegated to the Secretary of the Interior in regard to the production of fish and other forms of wild life.

SCHEDULE OF EVENTS

MAY

7- 8—American Society of Brewing Chemists, technical meeting, Hotel Statler, Cleveland, Ohio.

12-14—American Oil Chemists Society, 34th annual meeting, Roosevelt Hotel, **New Orleans, La.**

12-14—Conference on dehydration of fruits and vegetables, Agricultural Experiment Station, University of Maryland, College Park, Md.

24-25—Flavoring Extract Manufacturers Association of the U. S., Hotel Pennsylvania, New York, N. Y.

25-28—Association of Food and Drug Officials of the U. S., 47th annual meeting, Cosmopolitan Hotel, Denver, Colo.

JUNE

2- 3—National Confectioners' Association conference on wartime problems, Chicago, Ill.

2- 4—Institute of Food Technologists, annual meeting, Hotel Statler, St. Louis, Mo.

MONSANTO FOOD GRADE MINERAL SUPPLEMENTS

SODIUM FERRIC PYROPHOSPHATE

MONOCALCIUM PHOSPHATE

DICALCIUM PHOSPHATE

TRICALCIUM PHOSPHATE

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CALCIUM PYROPHOSPHATE

SPECIAL PHOSPHATES

IODIZED MIXTURES

These mineral supplements of exceptional purity ... and the experience of our technical staff... are at your service... to help you keep U. S. strong for the stern tasks ahead.

As the nation's largest producers of elemental phosphorus—from which our phosphoric acid and food grade phosphates are derived—Monsanto is in an excellent position to be of real help in your food fortification problems. For samples or the assistance of our technical staff, inquire: MONSANTO CHEMICAL COMPANY, Phosphate Division, St. Louis, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

"E" FOR EXCELLENCE—The Army-Navy "E" burgee with two stars, "representing recognition by the Army and the Navy of especially meritorious production of war materials" over a two-year period flies over Monsanto.

MONSANTO CHEMICALS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

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PROCESSING EQUIPMENT FOR WAR INDUSTRIES

Robinson Engineers are at your service! Avail yourself of their experience and of the facilities of our modern testing laboratory. Illustrated catalogs on request for any "Unique" equipment.

"Unique" Saw Tooth Crusher. Special grade steel saws, mounted in roller bearings. Heavy-duty balance wheel carries intermittent shock load.

"Unique" Jr. Disc Grinder. Built-in direct-drive motor. Shown equipped with jacket for hot or cold water or steam and mounted on steel base.

"Unique" Tumbling Prism Mixer. Driven by gearhead motor. For handling dry powders that cannot stand much agitation. All-steel welded frame.

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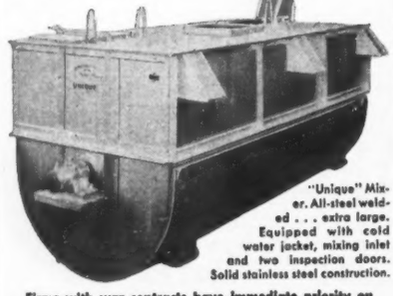


"Unique" Mixer. All-steel welded . . . extra large. Equipped with cold water jacket, mixing inlet and two inspection doors. Solid stainless steel construction.

Firms with war contracts have immediate priority on our complete engineering and manufacturing facilities.

ROBINSON MANUFACTURING COMPANY

WORKS: MUNCY, PA.

30 CHURCH STREET, NEW YORK

Chemists Discuss Food Problems

Protecting foods against war gas and effects of hardness in water for canning considered

TECHNICAL information pertinent to the food industries was contained in several papers presented at the meeting of American Chemical Society at Detroit last month. Speaking on the protection of food against chemical attacks, Morris B. Jacobs, of the Department of Health, New York, said that packaging foods with several coverings, such as layers of dense paper, wax paper, cellophane, metal foil and other materials, provides good protection for hours and even days if the seams, edges and corners are intact. Laminated bags with several piles, one of which at least is gas resistant, are also useful. Synthetic rubbers, synthetic resins, metal foils and prepared papers are useful protective materials, if available.

Top floors and basements of warehouses should not be used for the storage of poorly packaged foods. And the product should be stacked in close piles and paulins or sheets of gasproof material should be available for covering.

The effect of heating thiamine solutions and meat containing thiamine in the presence of various concentrations of meat curing ingredients was discussed in a paper by D. A. Greenwood, B. W. Beadle and H. R. Kraybill of American Meat Institute. In experimental studies, a significant loss (19 to 80 percent) of thiamine occurred when a water solution of it was heated in a boiling water bath for one hour in the presence of sodium chloride at 1 to 5 percent concentration. Losses also occurred upon heating in the presence of small quantities of sodium nitrite (0.02 to 0.1 percent). But no loss of thiamine was observed when solutions of the vitamin were heated for one hour in the presence of sodium nitrate or sugars with heating in the presence of common salt, plus the other curing ingredients used in meat, there was no significantly greater loss than when the vitamin was heated in the presence of salt alone. When 2 percent of egg albumen or

TENTATIVE PROGRAM

Meeting of Institute of Food Technologists

Statler Hotel, St. Louis, Mo. • June 2–4, 1943

June 2

PRESIDENT NEWTON PRESIDING

9:45—Call to order, comments and keynote remarks by President Newton.
10:00—General announcements by chairman of local committee.
10:10—Agriculture's part in food economy in wartime.
11:00—The government's part in food economy in wartime.

2:00 P.M.

PRESIDENT NEWTON PRESIDING

1. Types of Food Needed by the Armed Forces, Colonel R. A. Isker, Quartermaster Corps, Subsistence Research Laboratory, Chicago.
2. Food Restriction and National Health, Dr. F. G. Boudreau, Milbank Memorial Fund, N. Y.
3. Vitamin Fortification and the Stability of Vitamins in Foods, Major V. O. Wodicka, Quartermaster Corps, Subsistence Research Laboratory, Chicago.
4. Frozen Foods in War Economy, Clarence Birdseye, Gloucester, Mass.
5. Concentrated Juices, H. S. Bailey, Exchange Orange Products Co., Ontario, Calif.

Evening

Evening meeting and buffet supper.
Nicholas Appert Medal Presentation.

June 3, 1943, 9 A.M.

S. C. PRESCOTT PRESIDING

Symposium on Dehydration of Foods

1. Tray and Tunnel Drying Methods and Equipment, W. B. Van Arsdel, Western Regional Laboratory, Albany, Calif. (awaiting permission from Washington).
2. Spray and Roll Drying Methods and Equipment, C. E. Gray, Golden State Co., Ltd., San Francisco.
3. Plant Problems in the Dehydration of Vegetables and Fruit, R. V. Tobin, Beech-Nut Packing Co., Rochester, N. Y.
4. Dehydration of Eggs, H. E. Goresline, Bureau of Agricultural and Industrial Chemistry, Washington, D. C.
5. Dehydration of Meats, H. R. Kraybill, American Meat Institute, Chicago.

2:00 P.M.

L. V. BURTON PRESIDING

Symposium on Containers and Packages

1. Container Situation as Affected by General War Situation.
2. Containers for Heat Processed Foods, C. O. Balls, Owens-Illinois Can Co., Toledo, Ohio.
3. Fiber and Export Food Containers, Major James d'A. Clark, Quartermaster Corps, Subsistence Research Laboratory, Chicago.
4. Dehydrated Food Compression, B. E. Proctor, Massachusetts Institute of Technology, Cambridge, Mass, and J. C. Sluder.

4:15 P.M.

Business session.

Evening

Municipal Opera for opening night of "Balalaika," St. Louis Municipal Theater.

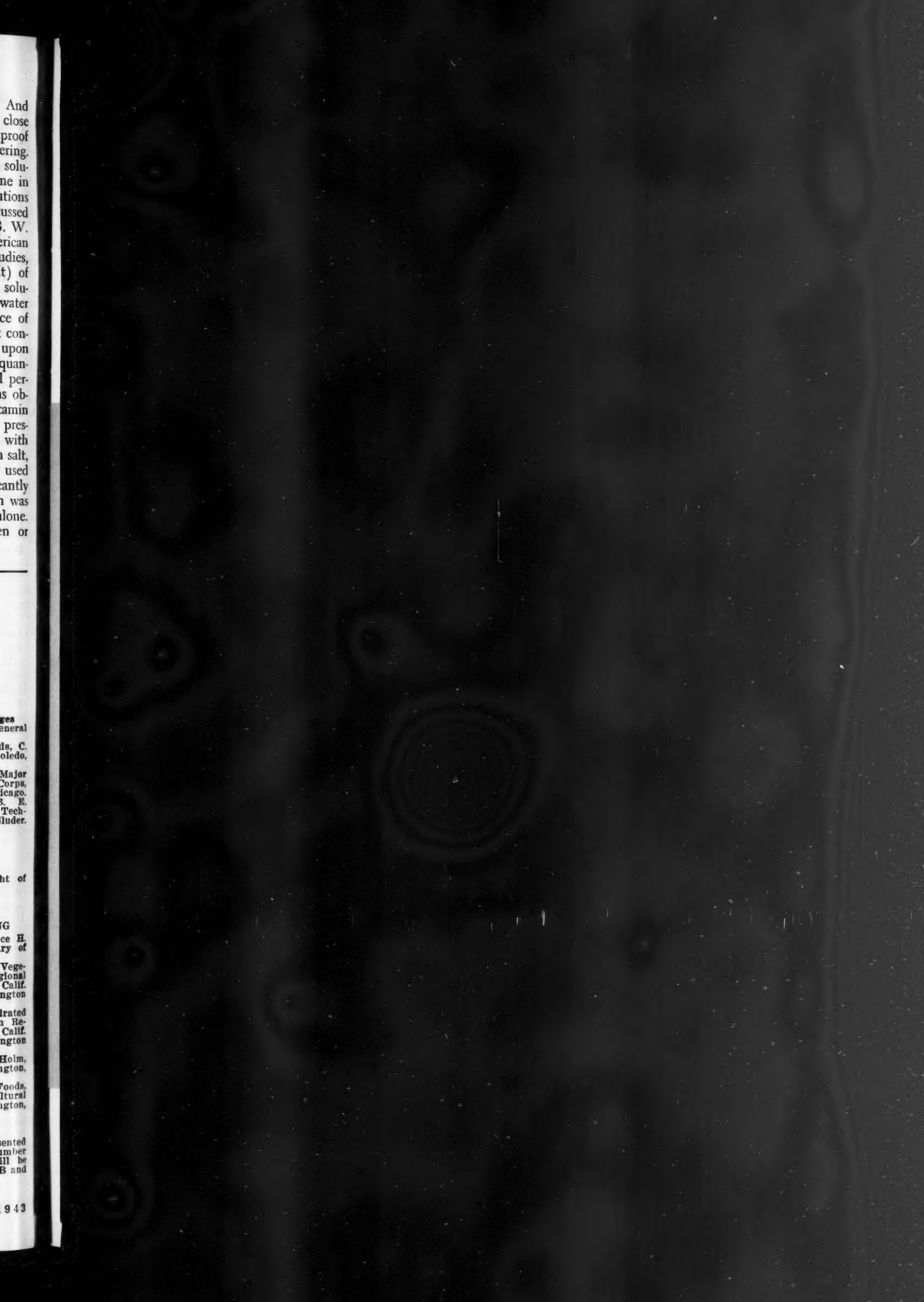
June 4, 1943, 9:00 A.M.

PRESIDENT NEWTON PRESIDING

1. Special Army talk, by Col. Lawrence H. Whiting, Consultant to the Secretary of War.
2. Dehydration of Dried Fruits and Vegetables, L. B. Howard, Western Regional Research Laboratory, Albany, Calif. (awaiting permission from Washington office).
3. Moisture Determination in Dehydrated Foods, Benjamin Makower, Western Regional Research Laboratory, Albany, Calif. (awaiting permission from Washington office).
4. Control of Fat Deterioration, G. E. Holm, Bureau of Dairy Industry, Washington, D. C.
5. Control of Enzymatic Actions in Foods, A. K. Balls, U. S. Bureau of Agricultural Chemistry and Engineering, Washington, D. C.

2:00 P.M.

Submitted research papers to be presented before subsections as the type and number of papers indicate. These papers will be grouped under subsection A, subsection B and subsection C.



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I'll take care of the fighting:

Telephone Service—WPB Order U-2, issued

I'll take care of the fighting!
If you'll take care of the FOOD!
UNLESS YOU PACK IT OUR BOYS CAN'T EAT IT
WHEN THE CANNING CROPS ARE READY BE PREPARED TO DO YOUR SHARE

APPEAL FOR MANPOWER

A series of colorful lithographed posters will be used by canners in recruiting the help needed to harvest and pack this season's crops of fruits and vegetables. Like the one illustrated here, they carry the slogan: "When the canning crops are ready, be prepared to do your share!" These posters have been lithographed at cost by Stecher-Traung Lithograph Corp., Rochester, N. Y. Federal Advertising Agency, New York, furnished the artwork and copy at cost.

gelatine was contained in the curing solution there was a significant decrease in the loss of the vitamin.

Chemists are making rapid progress with new processes for producing highly specialized fats, according to Dr. H. W. Vahlteich, of Best Foods, Inc. They are learning how to separate soybean oil into various fractions, some of which are suitable to replace linseed oil and others to replace cottonseed oil. They have also learned how to juggle the fat molecules around so as to produce entirely new fats from processing combinations of already well-known oils.

Water Problems

In canning certain vegetables, the use of water of excessive hardness, particularly calcium hardness, is undesirable because of the hardening or toughening effect, according to C. A. Greenleaf, of National Canners Association. On the other hand, a high residue of alkali bicarbonate resulting from softening may impart an insipid flavor or injure the texture and appearance of the product.

Corrosive action by water may be due either to acidity or excessive alka-

Has been granted no additional

....Your product well dressed in

Bemis WATERPROOF Bags

When you pack your product in Bemis Waterproof Bags, it is well dressed in *two* ways. It has eye appeal to help *sell,* if you're still competing for business . . . to help keep your brand *alive* if you're oversold. And it is well-dressed in these bags because they are *extra strong* to stand the added strain of today's capacity loading of trucks and freight cars.

Bemis Waterproof Bags are *custom made* for *your* product, not only in size and shape but in materials and construction. They have a layer of tough, tightly woven fabric on the outside, which is *bonded,* by special adhesives, to layers of paper in any combination your shipping problem requires.

This construction gives you containers that can keep moisture in and dampness out . . . retain desirable aromas and repel objectionable odors . . . shut out dirt and dust . . . resist acids and grease.

If you have a shipping container problem, why not ask our laboratories to help you? Complete details and samples sent promptly on request.

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BEMIS BRO. BAG CO.

St. Louis • Brooklyn

BETTER BAGS FOR 85 YEARS

CINNAMON

LOOKS LIKE CINNAMON!
TASTES LIKE CINNAMON!
SMELLS LIKE CINNAMON!
BAKES LIKE CINNAMON!

There are no restrictions on BASIC IMITATION CINNAMON! Extend your present stocks . . . use BASIC IMITATION CINNAMON in any product in which you would normally use natural ground CINNAMON. Its uniform characteristic flavor will not bake out. Ideal because its use will not affect your spice quota. BASIC IMITATION CINNAMON may be used alone or blended, in any proportion. Economical too . . . costs *less than half the price* of the natural product.

Also available are the following BASIC IMITATION Spices:

Nutmeg — **Allspice**
Mace — **Cardamon**
Ginger — **Soluble Black Pepper**

Write today . . . free samples and quotations will be sent immediately upon request.

BASIC FOOD MATERIALS, Inc.

1480 LAKESIDE AVENUE, CLEVELAND, OHIO

Laboratory Controlled BFM Products

Producers and Distributors of Unusually Good Products for Food Packers

HERE'S *the* EASY WAY
to know moisture content of DEHYDRATED FOOD

The STEINLITE
40 Gram Moisture Tester

Use a Steinlite Moisture Tester . . . the fastest and simplest way we know about for testing dehydrated food. Automatically registers moisture content of sample. Average test time is about one minute. Every machine checked against government standards. Accurate to .2 of 1%. Can accommodate as low as 1% or as high as 35% moisture content. Over 3000 users . . . many are leading food dehydrators. Temporarily available on: "Free Trial—no deposit—no priority—early shipment," *Write for Free Trial Plan today.*

"HEADQUARTERS" for Moisture Testers . . . Broad Line of Testing Equipment

SEEDBURO

Telephone Service—WPB Order U-2, issued on March 25 by the Office of War Utilities, orders that telephone service may be installed for "producers of substantial quantities of food where such service is essential to such producers' operations." Previous limitations on extensions in many instances denied telephone service to such customers. All new telephone installations will be on interim basis subject to removal if and when the equipment is required for essential war purposes.

Automotive Parts—Automotive replacement parts and automotive maintenance equipment have been removed from the list of items to the purchase of which preference ratings may be applied. Also excluded from preference ratings under the Controlled Materials Plan are cellophane and similar materials derived from cellulose having a gage of less than 0.003 in. and cellulose caps or bands of any gage.

Textile Bags—Restrictions of M-221, which permitted the use of only standard sizes of textile bags and shipping sacks for storage or shipment of certain commodities, were removed on March 30 for a group of commodities including nuts, animal feed, flour, starch and sugar. For the revised list of commodities still covered by the order, restrictions were placed on manufacturers of textile bags and paper shipping sacks instead of on the users of such bags.

Riboflavin—A shortage of riboflavin for defense needs resulted in M-299, issued on March 31, placing the vitamin source under allocation. The order covers both crude and refined forms of riboflavin but does not include standard dosage forms or combinations in feeds, foods and beverages or riboflavin concentrates of natural origin, and excepts from allocation control the use by any person of not more than five grams a month.

General Imports—Order M-63 on General Imports was amended by WPB on April 2, placing sardines and tuna fish packed in oil under control of List III of the order, which restricts importations except of products from Canada, Mexico, Guatemala or El Salvador which come by rail, air or inland waterway, but does not regulate distribution. Pickled or salted cod, haddock, hake, polluck and cusk were also added to List III. Peanuts, shelled and unshelled, were added to List I, which controls the processing and distribution of authorized imports. Dried milk products, including whole and skimmed milk, buttermilk and cream, were placed on List III, making them subject to the same control as condensed and evaporated milk.

Malt and Malt Sirup—To conserve malt for the manufacture of industrial alcohol, the use of malt and malt sirup by large brewers is reduced 7 percent below 1942

Corrosive action by water may be due either to acidity or excessive alka-

Has been granted no additional authority that would enable him to solve food problems

AT MID-APRIL there was still no indication that Chester Davis had received a grant of power that would enable him to do anything to improve the food situation. The executive order establishing him as the new food administrator gave Mr. Davis slightly less power in handling foods than had been given to Secretary Wickard. Since that time there has been no official or unofficial indication if or when the needed additional powers will be forthcoming.

Some Washington observers believe that the political considerations surrounding the Bankhead and Pace bills are the cause for the delay. Those holding this view point out that it would be a tactical blunder to formulate a policy prior to the clarification of the political and legislative issues which in their final settlement might force a change in the program almost as soon as it was announced.

Food processors have been encouraged in the last month by the expressions of topside WPB officials that Mr. Davis will receive all the materials and other assistance necessary to solve the food problem which they feel is today's No. 1 national problem. This lip service to the cause of food may sound well to the members of the industry out in the hinterland, but in Washington it means nothing unless means are provided to put the ideas and policies into effect. So far, nothing has been done in this direction. Food processors are having and will probably continue to have as much trouble as ever getting new equipment and supplies necessary to carry on their business.

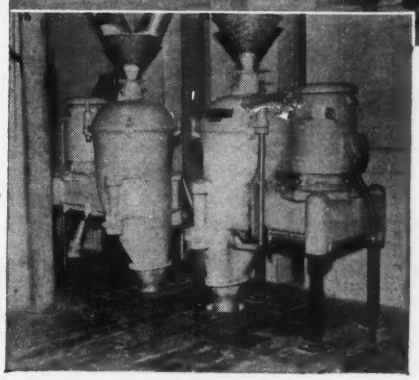
BAIC Work Transferred

PRACTICALLY all experimental work of the Bureau of Agricultural and Industrial Chemistry has been moved out of Washington. Between 60 and 70 members of the staff formerly engaged in this type of activity at the headquarters of the Department of Agriculture have been transferred to the four Regional Laboratories, leaving a small skeleton staff in Washington.

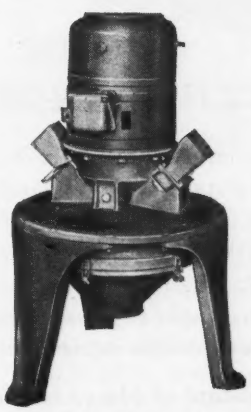
War Food Conference Set

FOOD MANUFACTURERS will meet June 9-10 in New York, to consider solu- on the grounds to permit horticultural research. The laboratory is about a block

Waterfront view of the big Superior, Wis., plant of King Midas Mill where "ENTOLETERS" are in use.



This pair of "ENTOLETERS" are early models, but they still give 100% service in the King Midas Superior Mill.



"ENTOLETER" shown above handles 15,000 lbs. per hr. Also in sizes to handle 2,000, 5,000 or 10,000 lbs. per hr.

Proved Method Stops Insect Infestation

King Midas Mill Company, one of the world's largest manufacturers of Durum products, was among the first users of the "ENTOLETER" Infestation Destroyer. This progressive company now has "ENTOLETERS" in regular service in both its Superior, Wis., and Hastings, Minn., plants.

Proof of "ENTOLETER'S" 100% efficiency is in its use. Its mechanical action completely destroys all forms of infestation in flour, cereals, spices, granulated, powdered or similar dry materials INCLUDING DEHYDRATED PRODUCTS.

Inexpensive, easy to install and operate. Extremely low maintenance. ENTOLETER DIVISION, The Safety Car Heating and Lighting Company, Inc., 230 Park Avenue, New York, N. Y.

ENTOLETER

INFESTATION DESTROYER

AVAILABLE TO FOOD EXECUTIVES

A new brochure, "Science at Your Service", has been prepared for executives, plant managers, technologists and others in the food field.

War times present many new problems. New ingredients, new formulas, new processes, new packaging—vitamin retention, enrichment and control.

This brochure describes the facilities of our organization in helping you meet these problems. A copy will be sent upon request.

FOOD RESEARCH LABORATORIES, INC.
48-14 Thirty-Third St., Long Island City, N.Y.
Over 20 years' service to industry

Trustworthy—
IN
"GREEN" HANDS
When experienced help is scarce, the use of a thoroughly dependable cleaner is a "must". Metso is your trustworthy cleaner for removing all grease, oil and solid matter. In addition, it aids in preserving your irreplaceable equipment.
This safety feature of Metso is due to its unique silica (SiO_2) content which balances the cleaning action, protecting against chemical attack. Put Metso to work in your plant.
Sodium Metasilicate U. S. Pat. 1898707
METSO
PHILADELPHIA QUARTZ CO.
Gen'l Off.: 125 S. Third St., Phila., Pa. - Chicago Sales Off.: 205 W. Wacker Dr.

...ERMEN in British Columbia waters...

the use of malt and malt sirup by large brewers is reduced 7 percent below 1942 ... the entire food industry that it is doubtful if the manufacturers can handle this year's pack.

Bakers Allowed More Shortening by OPA

OPA's recent about-face on the allotment of fats for bakery products gave bakers their first easy moments since the original rationing announcement. Fats will now be allotted for bakery products this quarter—April, May and June—in an amount equal to consumption during the corresponding quarter of 1942, and bakers can use their present quarterly allotment at the same rate as last year. OPA's dictum early this year restricting the use of fats in bakery products and its simultaneous desire for increased production of baked goods to offset shortages found that government agency hoist by its own petard. To make possible the new allocation, which represents an increase from the 70 percent ration granted originally, OPA will make additional ration points available to bakers prior to June 1 for use during that month.

Soup Mix Men Form Trade Association

RAPIDLY INCREASING sales of dry and dehydrated soups and consequent production problems have resulted in a new trade association, The Soup Mix Manufacturers, formed recently with L. J. Gumpert, B. T. Babbitt, Inc., as chairman of the group. Mr. Gumpert said that the sale of soup mixes had skyrocketed from $300,000 in 1939 to an estimated $40,000,000 in 1943. Two of the most pressing problems facing the manufacturers are raw material shortages and rationing. A Committee on Raw Materials and a Committee on Rationing, as well as an Executive Committee were named at the organization's first meeting, at which time Robert Smallwood, president of Thomas J. Lipton, Inc., was named vice-chairman and Robert Brenner of Aunt Polly Soup Mix was elected secretary-treasurer.

Snider Opens New Research Laboratory

THE new research laboratory of Snider ...

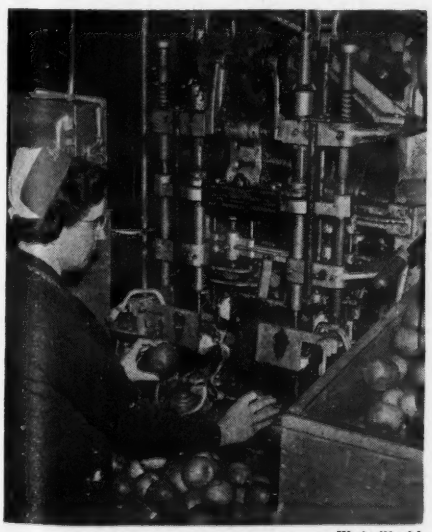
FOOD MANUFACTURERS will meet June 9-10 in New York to consider solution on the grounds to permit horticultural research. The laboratory is about a block west of Snider's Albion plant.

Harold J. Humphrey, vice-president in charge of research and frozen food operations, and formerly superintendent of the Albion plant, continues to make his headquarters in the main office in Rochester, N. Y. Dr. Kenneth G. Dykstra is in direct charge of the laboratories. Dr. Walter D. Enzie, formerly of the New York State Agricultural Experiment Station, who heads up the horticultural research, joined the organization on April 12.

Develops Plan To End Bad Situation in Meat

MEAT PACKERS, livestock producers and meat marketers have formed a Livestock and Meat Council which will endeavor to work out a solution to the wartime meat problem. The Council has sent a committee to Washington in an effort to have put into operation quickly a comprehensive, businesslike program designed to correct the acutely chaotic conditions surrounding the national meat supply.

The basic principles of the proposed program include encouragement of livestock production, adequate control of livestock slaughter, keeping the demand in balance with the supply, an overall government meat management administration, and an educational program to enlist public understanding and support.



Wide World

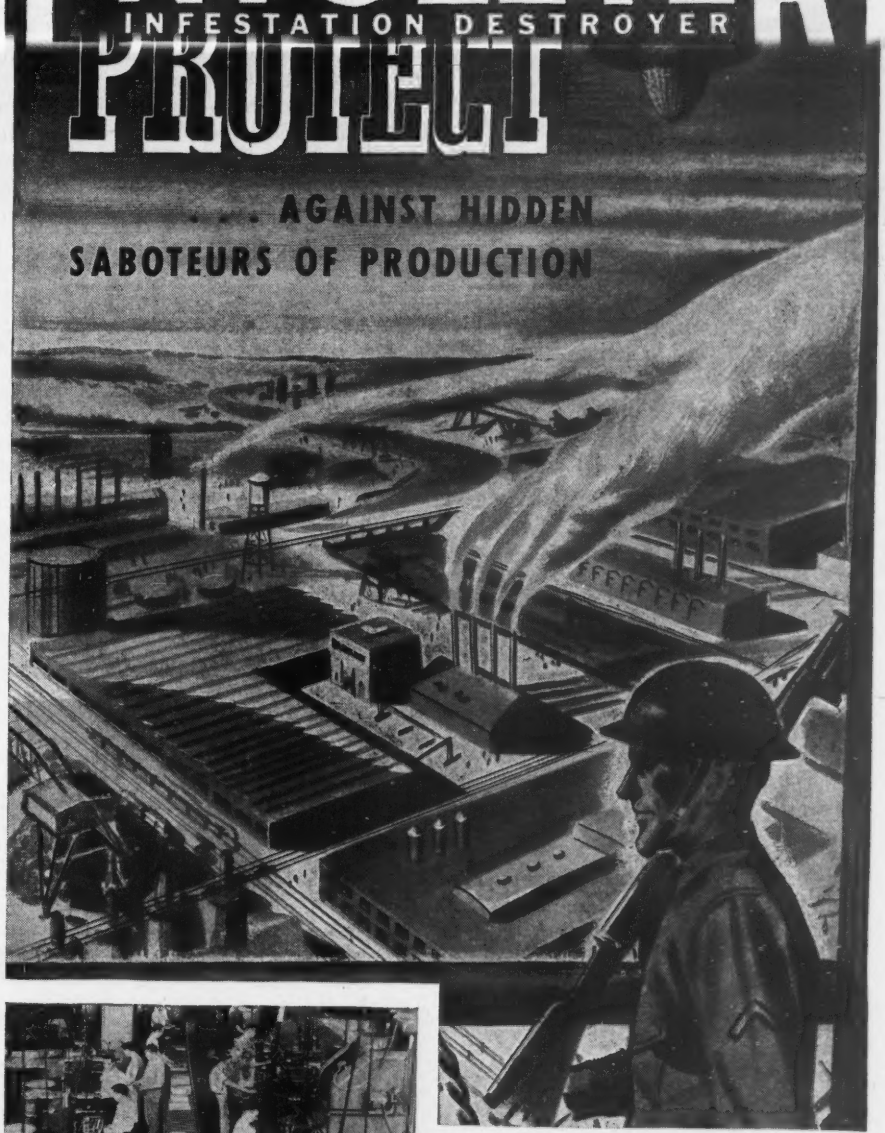
PEELS APPLES FOR ARMY

At the plant of Deerfield Packing Co., Bridgeton, N. J., where apples are dehy-

INFESTATION DESTROYER

PROTECT

. . . AGAINST HIDDEN SABOTEURS OF PRODUCTION



ASK the men in charge of operations on the working front . . . these men know the value and importance of Standard Conveyors in guarding against many hidden "saboteurs" of production—the congestion of working areas, the delay in getting materials and parts from one department to another—the loss of valuable man-hours in needless fetch-and-carry operations.

In foundries, munitions plants, steel and brass mills, aviation machine shops and scores of other plants, Standard Conveyors are helping to maintain the swift tempo of wartime production.

If you are producing war material or other products regarded as necessary to the war effort, Standard Conveyors are available for your handling needs. Write for full information and a copy of the booklet, "Conveyors by Standard." FI-5.

STANDARD CONVEYOR COMPANY

General Offices: NORTH ST. PAUL, MINN.

Sales and Service in All Principal Cities

STANDARD

Gravity and Power

Cheese, all kinds, in storage on March 1, 1943, was 94,532,000 lb. A year earlier

PHILADELPHIA QUARTZ CO.
Gen'l Off.: 125 S. Third St., Phila., Pa. Chicago Sales Off.: 205 W. Wacker Dr.

FISHERMEN in British Columbia waters may soon seek their catch by sound. This method of locating large schools of fish has proven effective in Norwegian waters, it is reported, and it is to be tried out in the B. C. herring fisheries. British Columbia Packers, Ltd., is fitting a 45-ft. boat with an echo sounding device at a cost of $4,000 to $5,000. Originally devised to aid ships in shallow waters, this echo sounder has been developed until it will record a "whisper." The sound will echo back from a large mass of fish and the distance will be recorded on a chart.

U. S. Grading of Lamb and Mutton Ordered

COMPULSORY GOVERNMENT grading of all lamb and mutton carcasses sold by packers and wholesalers was ordered on April 10 by OPA as part of its program of control over the prices of these meats. The amendment 3 to MPR 239 is in line with OPA's previously announced intention to tie price to quality wherever necessary to protect ceilings, and also changes the original regulation in other ways to bring it more ment grading was desirable in the interests of price enforcement, but when the order was issued there was insufficient trained personnel available to handle the job. Since then the Department has expanded its staff to assume the task.

Federal Stamp on Meat Required by New York

All carcasses of animals to be sold for consumption as meat in New York City must bear the Federal imprint or stamp showing the identity of the slaughterer, as required by the U. S. Department of Agriculture. This is the provision of an amendment made in April to the New York City Sanitary Code.

This action was taken at the request of the U. S. Department of Agriculutre as a cooperative step in efforts to wipe out the black market sale of meat in New York City.

Price Index Edges Up

Although the change was much less rapid than in former months, commodity prices continued to edge upward

THE new research laboratory of Snider

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1943 (thousands)
Bakery	$50	.....	.....
Beverages	.....	.....	.....
Canning and Preserving	211	.....	$75
Cold Storage Plants	.....	$40	40
Confectionery	.....	.....	.....
Grain Mill Products	80	442	557
Ice Manufactured	.....	.....	40
Meats and Meat-Products	40	.....	125
Milk Products	270	80	160
Miscellaneous	499	40	1,280
	$1,150	$602	$2,277

in the period from mid-March to mid-April. The general weekly commodity price index of the *New York Journal of Commerce*, which stood at 108.2 on March 13, 1943, had risen to 108.5 by April 10th. For the same four weeks, that publication's food commodity index rose from 113.5 to 114.4, while its grain index fell from 109.2 to 108.9.

Spot prices of food commodities showed few changes during the same four weeks, as most were steady under ceilings. Wheat, No. 2 hard winter, Kansas City, increased from $1.36½ to $1.37¾. Corn, No. 3 yellow, Chicago, rose from $0.99 to $1.00. In contrast, flour fell from $7.20 to $7.00

Feed Supplies Govern 1944 Food Supplies

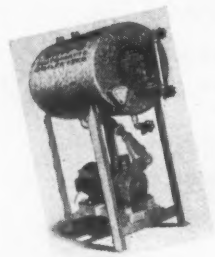
With between 10 and 15 percent more livestock on American farms in 1943 than last year, the abundant supplies of feedstuffs from the 1942 harvest have been disappearing at an unusually high rate. While this situation is not likely to affect food supplies in 1943, it does threaten the 1944 food supply. Unless production of grain and protein feeds is larger this year than it was last year, it may be difficult to keep livestock numbers at the desired level.

Reports of intentions to plant, as given in the April report of the Crop Reporting Board, indicate that, provided the growing weather is suitable and sufficient manpower is available, this goal may be reached. Acreage to be planted to corn is set at 97,000,000 acres, an increase of 6,000,000 acres over 1942. Oats and other small grains, also hay, are expected to equal 1942 plantings. Soybean plantings are forecast as greater than last year, as are flaxseed plantings. Supplies of cottonseed are not yet predictable.

The low spots in the outlook appear

CONTROLLED TEMPERATURES
for processing jellies, creams and pie fillings

call for **KANE** *Gas-fired*
STEAM BOILERS



For any process requiring precise temperature control and maximum cleanliness, the steam-generating combination shown above is hard to beat. The Kane Automatic Gas-Fired Boiler and M-K-O Boiler Feed and Condensate Return System provide a practically fool-proof source of process steam . . . at remarkably even pressure . . . with minimum attention . . . and minimum fuel consumption. Kane Boilers embody many features and are made in sizes from 1 to 30 H.P. Processors of essential foods should have no difficulty in securing required priority for needed boiler equipment.

At the plant of Deerfield Packing Co., [illegible] where apples are deliv-

Gravity and Power

Flour production in March, 1943, as reported by *The Northwestern Miller* for mills producing 65 percent of United States output, totaled 7,200,367 bbl., compared to 5,588,470 bbl. for the corresponding month last year.

Wheat, winter, to be produced in 1943 was estimated by the crop reporting board on April 1st at 558,551,000 bu., the smallest yield in seven years and 145,000,000 bu. below last year's crop.

Wine consumption in 1942 is estimated at 112,000,000 gal., an all-time high.

Sardine catch, 1942-1943 season, final figures, totaled 1,002,576,000 lb., compared to 1,242,008,000 lb. in the preceding season.

Green and wax beans canned in 1942, according to a recent report of National Canners Association, totaled 23,790,346 standard cases, compared to 12,494,319 cases in 1941.

Cabbage acreage, total, planned for 1943 is reported at 171,850 acres, compared to 184,420 acres harvested in 1942.

Sweet corn acreage for processing expected to be planted this year, according to a USDA report for late March, totaled 542,430 acres, compared to 517,000 planted in 1942.

Snap bean acreage for processing expected to be planted this year, according to a USDA report for late March, totaled 165,240 acres, compared to 138,400 acres planted in 1942.

Milk production on farms in February, 1943, was 1 percent larger than in February, 1942, while milk production per cow was approximately the same.

Evaporated milk production in February, 1943, was 207,192,000 lb., compared to 300,003,000 lb. in February, 1942. This figure was 40 percent over the 1937-1941 average February production.

Condensed milk, all kinds, produced in February, 1943, totaled 57,258,000 lb., compared to 50,712,000 lb. in February, 1942.

Whole milk, dried, produced in February, 1943, was 7,850,000 lb., compared to 2,175,000 lb. in February, 1942, and was 416 percent over the 1937-1941 February average.

Skim milk, dried, produced in February, 1943, totaled 31,900,000 lb., compared to 41,810,000 lb. produced in February, 1942, and was 3 percent above the 1937-1941 average February production.

Chicks hatched in February, 1943, totaled 12,927,000. This was a new record for February and was 24 percent above the previous high for the month, recorded a year before.

Butter, creamery, produced in February, 1943, totaled 121,995,000 lb., compared to 118,020,000 lb. in February, 1942, and to a 1932-1941 February average of 116,575,000 pounds.

Cheese, American, produced in February was 46,995,000 lb., 24.9 percent below production a year earlier, but 68.9 percent over the 1932-1941 average February output.

Beans, dry edible, are expected to be grown on 2,480,000 acres in 1943, an increase of 16.2 percent over the acreage planted in 1942.

Potato acreage expected for this year is 3,174,000 acres, up about 14 percent from that planted a year ago.

Confectionary and competitive chocolate products sales in February, 1943, totaled $33,925,000, exclusive of Army ration bar sales, for the 215 firms reporting to the Department of Commerce. This was 19 percent more than in February, 1942.

Fruits, frozen, in storage on March 1, 1943, totaled 145,022,000 lb., compared to 142,192,00 lb. on March 1, 1942, and to a 1938-1942 average of 115,180,000 lb. for the date.

Vegetables, frozen, in storage on March 1, 1943, were 75,454,000 lb., compared to 73,245,000 lb. a year before.

Butter, creamery, in storage on March 1, 1943, totaled 12,321,000 lb., compared to 63,701,000 lb. on March 1, 1942, and to

Cheese, all kinds, in storage on March 1, 1943, was 94,532,000 lb. A year earlier the figure was 160,073,000 lb., and the 1938-1942 average for the date was 107,929,000 pounds.

Eggs, case equivalent, in storage on March 1, 1943, amounted to 2,466,000 cases, compared to 2,496,000 cases on March 1, 1942, and to an average in 1938-1942 of 1,821,000 cases for the date.

Poultry, all kinds, in frozen storage on March 1, 1943, totaled 101,697,000 lb., compared to 179,083,000 lb. a year before and to an average in 1938-1942 of 140,778,000 lb. for the date.

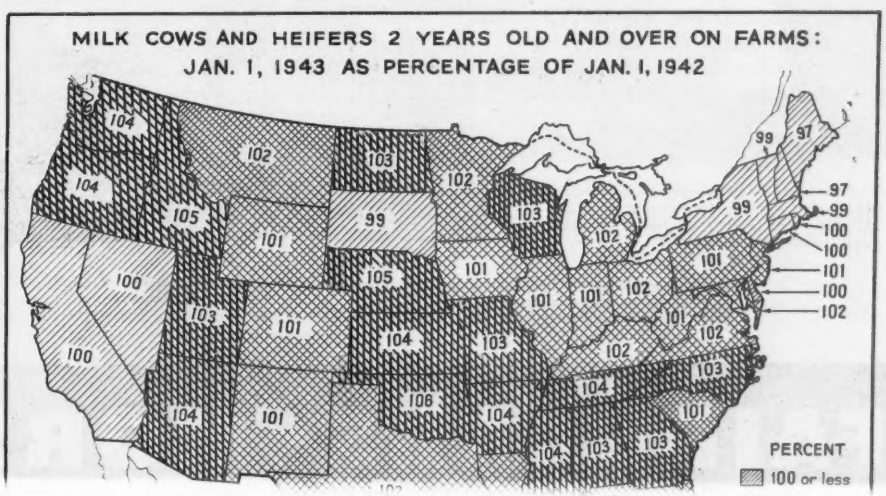
Meat, frozen, cured, and in cure, in storage on March 1, 1943, was 833,733,000 lb., compared to 891,161,000 lb. on March 1, 1942, and to an average in 1938-1942 of 818,281,000 lb. for the date.

Lard in storage on March 1, 1942, was 116,262,000 lb., and rendered pork fat on the same date totaled 7,451,000 lb. The figures for the two products a year earlier were 201,900,000 lb. and 4,665,000 lb. The combined average for these products in 1938-1942 was 206,421,000 lb. for the same date.

Weekly food price index of Dun & Bradstreet on April 3, 1942, stood at $4.10. This was 1¢ below the 22-year high recorded on March 20, but was 47¢ above the $3.63 recorded for the corresponding April date last year.

Business activity index of *Business Week* stood at 203.2 on April 10, 1943, compared to 200.3 a month before and to 177.2 on the corresponding 1942 date.

Cost of living index of National Industrial Conference Board for March, 1943, stood at 102.8, compared to 101.8 in February and 96.1 in March, 1942.



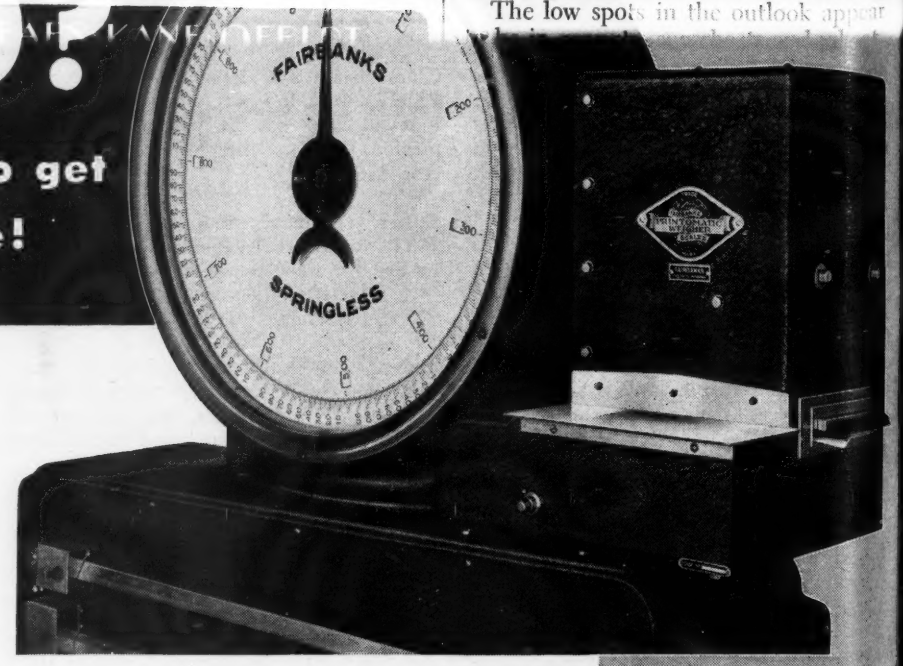
Boiler equipment.

not yet predictable.

The low spots in the outlook appear

GOOD!

They have to be to get where they are!

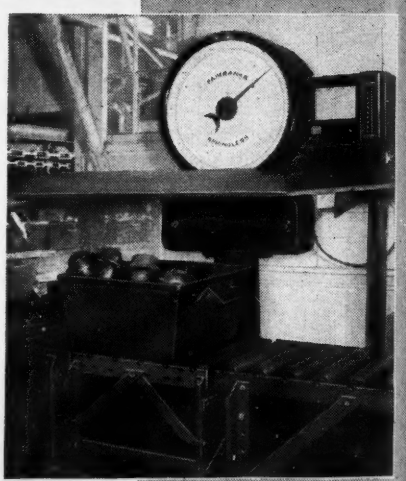


In good light or bad . . . operated by experienced weighmen or novices . . . weighing all kinds of commodities . . . Fairbanks Printomatic Scales have proved to the world that they have what it takes! They eliminate human errors, speed up weighing operations, and provide a PRINTED record showing what was weighed, who weighed it, and when.

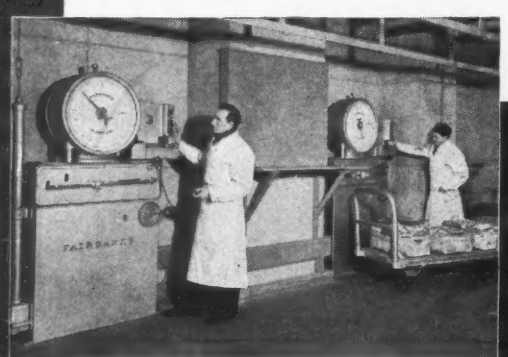
Fairbanks Scales have proved their reliability through their 113 years of service. Each part, carefully designed for its specific function and built with precision, guarantees your incoming, outgoing, and processing weight operations.

The Printomatic records the correct weight automatically, prints it on a roll tape, weigh ticket, or combination of both, or on gummed tickets. Adaptation of Fairbanks Printomatic Scales to weighing problems, simple or complicated, is practically unlimited. Why not investigate what these scales can do for you? Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

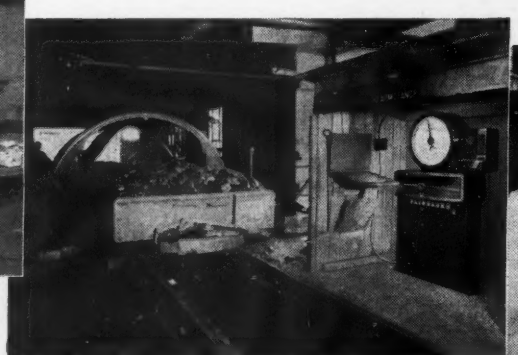
★



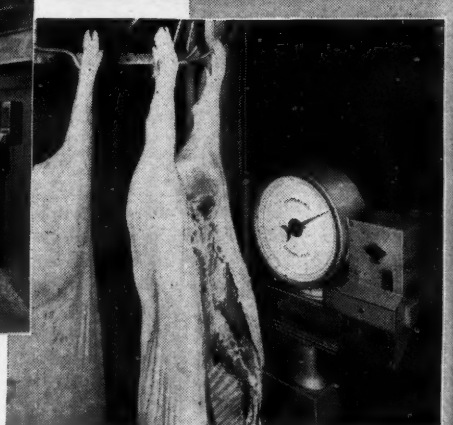
Fairbanks Printomatic Conveyor Scale keeps printed record of piecework in foundry.



Fairbanks Printomatics recording meat shipments to retailers. Each of 221 different kinds of meat is given a designating number.



Fairbanks Coal Mine Car Scale with Printomatic weighs mine cars in motion, protecting employer and miner.



Fairbanks Portable Dial Scale with Printomatic weighing and printing records of meat to retailers.

FAIRBANKS-MORSE

H. E. Babcock, founder of the Grange ... ment of new industrial uses for vegetable oils, proteins and their derivatives.

1942, and was 3 percent above the 1937-

100 or less

INDUSTRY

American Dietaids Co., Yonkers, N. Y., has purchased a former Standard Oil Co.'s plant in Middletown, N. Y., and plans to dehydrate $4,000,000 worth of food annually.

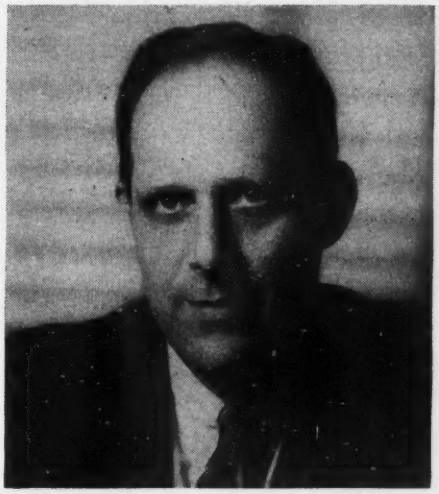
American Home Products Corp., Jersey City, N. J., is negotiating to acquire G. Washington Coffee Refining Co., manufacturer of instant coffee. Completion of this deal will be the company's second expansion step in 1943.

American Macaroni Co., Birmingham, Ala., a newly formed organization, has taken over the American Macaroni Manufacturing Co., which has a daily production capacity of 50,000 packages of macaroni and spaghetti.

Armour & Co., Chicago, Ill., is distributing a large wall chart, 62x42 in., showing the ration point value for all meats and foods requiring red ration stamps. The chart is big enough so that customers as well as clerks can read the points easily.

Detroit Rendering Co., Detroit, Mich., has painted spectacular signs on one of its trailer-trucks to promote the collection of household fats. One sign reads—"Shell Out Your Fats and Blast Out the Rats."

General Mills, Inc., Minneapolis, Minn., has published an 19-page booklet, "War-Work—A Daybook for the Home," pointing out what can be done in the home to contribute to the war effort.



RAYMOND E. GAYLORD and W. N. BURDING

Standard Brands, Inc., New York, N. Y., has announced the appointment of Raymond E. Gaylord as manager of the company's Royal Division, and W. N. Burding as manager of the Fresh Foods Division. Mr. Burding has been with the concern for many years, and Mr. Gaylord was formerly general sales manager of Rumford Chemical Works.

Kentucky-Tennessee Food Co-operative has been formed in Hopkinsville, Ky., as a subsidiary of Eastern Dark Fired Tobacco Growers' Co-operative Association, to operate large vegetable dehydrating plants.

King Milling Co., Lowell, Mich., manufacturer of flour for the Army and Federal Surplus Commodities Corp., was destroyed by fire with damage amounting to $250,000.

Lever Bros. & Unilever, Ltd., recently purchased General Foods Corp.'s controlling interest in its subsidiary, Frosted Foods, Ltd., London, England. The postwar plan is to extend the sale of Birds Eye quick frozen foods to countries outside of the United States and its possessions.

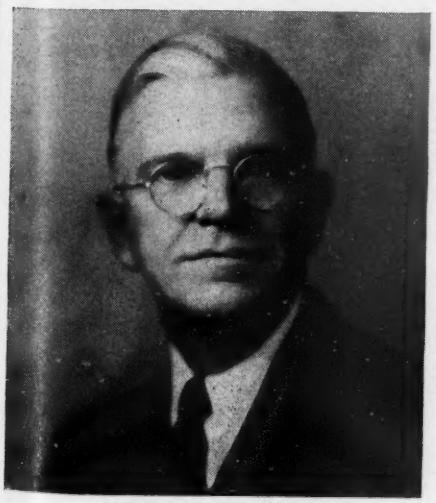
National Starch Products, Inc., New York., has begun the development of a domestic-grown replacement for tapioca, known as "waxy" starch, from "waxy maize." The company has also opened its newly reconstructed plant at Indianapolis, Ind.

Shiocton Kraut Co., Shiocton, Wis., is installing two complete tunnel type dehydrating units to dehydrate cabbage and potatoes.

Soy Flour Association of Chicago has established a research kitchen where new recipes will be developed and made available to the soy flour trade for distribution to the public.

Stokely Bros. & Co., Indianapolis, Ind., has received the first Army-Navy "E" award presented to a food canning plant. Armour & Co.'s Union Stockyard, Chicago, Ill., Loose-Wiles Biscuit Co., Long Island City, N. Y., and Shefford Cheese Co., Inc., Green Bay, Wis., have also been awarded the "E" pennant.

U. S. Quartermaster Corps has developed a new precooked dehydrated rice pudding for use overseas.



DR. EARLE O. WHITTIER

L. V. HASS

Waukesha Roxo Beverage plant, Wau-

bby, McNeill & Libby, [illegible] Ill. [illegible] New York, N. Y., ha

SCALDING

H. E. Babcock, founder of the Grange League Federation and chairman of the board at Cornell University, has been named chairman of the newly formed Emergency Food Commission of New York State. Dean Carl E. Ladd, of the New York College of Agriculture at Cornell, becomes executive director.

N. Laughlin, manager of the Memphis plant of Continental Baking Co., New York, N. Y., has been appointed regional sales manager of the company with headquarters in Chicago.

G. G. Lister, formerly secretary and treasurer of Canadian Canners, Ltd., Vancouver, B. C., has been elected general manager of its subsidiary, Canadian Canners Western, Ltd., succeeding Willis James West.

Carl N. Lovegren, president of the Canners League of California, who recently resigned as president of Hunt Bros. Packing Co., San Francisco, Calif., is now devoting all his time to the Canners League activities.

Dr. Ralph H. Manley, formerly head chemist and chief of the oil and protein division of Northern Regional Research Laboratory, U. S. Department of Agriment of new industrial uses for vegetable oils, proteins and their derivatives.

John T. McCarthy, president of Jersey Bread Co. and Sandusky Baking Co., both in Ohio, becomes executive assistant to the president of American Bakers Association, with offices in Washington, D. C. Until recently, he had been the baking industry's representative on WPB.

Cecil H. McKinstry has been appointed president of Imperial Candy Co., Seattle, Wash., succeeding the late Chester E. Roberts.

W. T. Parker, manager of Peanut Growers Cooperative, Suffolk, Va., has been given leave of absence to supervise peanut production for the government, working with the Commodity Credit Corp. Mr. Parker will also be in charge of soybean production.

George W. Penny, advertising manager for Rumford Chemical Works, Rumford, R. I., has been elected manager of the Baking Powder Division, in charge of sales and production.

Lorne N. Reynolds, who has been a member of Canada Packers, Ltd., Vancouver, B. C., for 22 years, has been appointed general manager of the company.

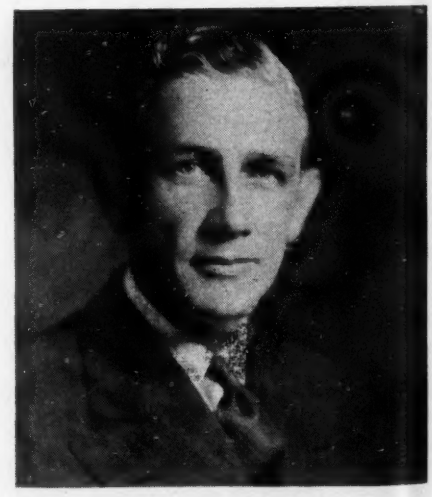
RACHAEL REED

Formerly Mid-west director of consumer relations for Borden Co., Rachael Reed becomes director of consumer relations for the company, with headquarters in New York. Miss Reed has also been director of local council units of National Dairy Council in Nashville, Dayton, Cincinnati and Kansas City.

Norton Simon, head of Val Vita Food Products, Inc., has been elected president of Hunt Brothers Packing Co., San Francisco, Calif., succeeding Carl N. Lovegren, who resigned.

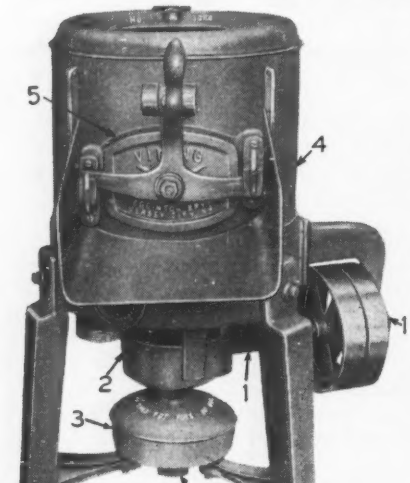
Glen A. Spaulding, manager of oil distribution for Spencer-Kellog & Sons, Inc., Buffalo, N. Y., has received leave of absence to join the oil and fats section of Food Distribution Administration.

Jessie W. Tapp., vice-president of the Bank of America, has been granted leave to become associate administrator to Chester M. Davis, new Food Administrator.



ROBERT L. GARNER

The VIKING PEELER



Essential Equipment for

CANNERS and DEHYDRATORS

of

White Potatoes	Horseradish
Sweet Potatoes	Radishes
Carrots and Beets	Turnips and Yams

• OPERATION

Peels and washes—and drains peelings—**all in one operation;** belt or motor driven.

• CAPACITIES

50 to 60 lbs. per minute—1,000 lbs. per hour
70 to 75 lbs. per minute—1,400 lbs. per hour

• ECONOMY

Waste reduced to absolute minimum—and recoverable for cattle feed. Most economical in first cost, operation, maintenance and space.

FEATURES

1. Heavy bronze removable sleeve bearings.
2. Cut bevel gears, 4 Pitch.
3. 10" dia. thrust bearing running in oil.
4. Genuine carborundum abrasive FUSED onto entire inner surface of peeling

Manufactured by

ROBINSON BROTHERS

Protect Essential Foods

Waukesha Roxo Beverage plant, Waukesha, Wis., March 25, in Milwaukee, Wis.

Edward H. Beaumont, 55, secretary-treasurer of Hava-Cola Extract & Sirup Co., Nashville, Tenn., March 28, in Nashville.

Peyton T. Carr, 79, retired president of Kehlor Flour Mills, St. Louis, Mo., recently, in St. Louis.

Ralph V. Grayson, 50, director of Frozen Food Institute, Inc., Elizabeth, N. J., and an outstanding technologist and refrigerating engineer in the frozen food industry, April 14, in New York City.

Frederick Hansen, 67, former vice-president of Grocery Store Products Sales Co., New York, N. Y., April 14, in St. Petersburg, Fla.

James W. McMorris, 61, owner of Mcmorris Creamery plants in Ashtabula, Ohio, for 33 years, March 30, in Ashtabula.

John M. Millar, retired vice-president of Lever Bros., Ltd., and former president of Canadian National Exhibition, April 7, in Toronto, Canada.

William J. Shortreed, 63, vice-president and member of the board of directors of H. J. Heinz Co., Pittsburgh, Pa., recently, in Pittsburgh.

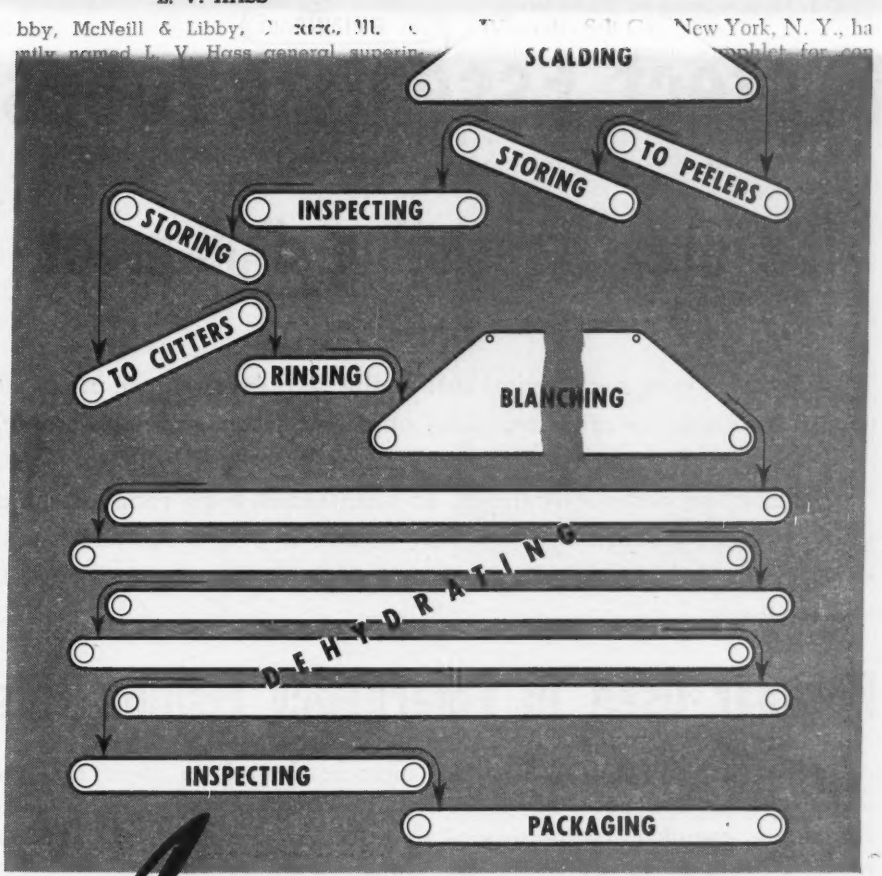
ASSOCIATED INDUSTRIES

Bemis Bro. Bag Co., St. Louis, Mo., has increased its facilities for the production of multiwall bags, to meet the increasing war needs for packaging in the South, by relocating equipment at Mobile, Ala. This move will also result in a saving of transportation facilities.

Caterpillar Tractor Co., Peoria, Ill., the Philadelphia plant of Container Corp. of America and Foote Bros. Gear & Machine Corp., Chicago, Ill., have been presented the Army-Navy "E" award for excellence in production. Carrier Corp. of Syracuse, N. Y., has been reawarded the Army-Navy "E" for the third time.

Monsanto Chemical Co., St. Louis, Mo., has elected Charles Belknap, executive vice-president, to the presidency. He succeeds Edgar M. Queeny, who becomes chairman of the board. Mr. Belknap will be in charge of operations, engineering and

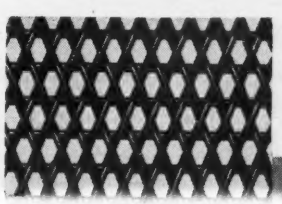
bby, McNeill & Libby, ... New York, N. Y., ha... booklet for con...



"Assembly Line" METHODS OF VEGETABLE DEHYDRATION

Audubon "Metalwove" Continuous Processing and Conveying Belts of "Flexibly Woven" Wire provide the modern "assembly line" methods of automobile (now tank, airplane and engine) manufacturers, for dehydrating and other food plants. Every production step from the harvested vegetable to the packaged product is a smooth, synchronized F-L-O-W, adjustable to the output desired or the processing-time requirements of various vegetables.

NO PRODUCTION BOTTLENECKS **Vegetables "flow" through one process after another, each Metalwove Belt being gravity "self-loading." Labor in loading or unloading is thus eliminated in this modern, "trayless" system. Metalwove Belts can be supplied with any size opening between wires to assure maximum water drainage or heated air circulation; further, the wires can be of any diameter necessary to carry the load. Retaining edges of flexible metal plates or woven wire can be supplied to keep vegetables from falling off the belts; likewise, cleats or flights can be supplied to remove vegetables from Lye Peelers or Underwater Storage, or for elevating vegetables to the next process or to the floor above. . . . Our engineers will gladly assist you in selecting the best type of weave and specification for every processing belt in your plant, whether it be existing, pilot, or contemplated. Catalog on request.**



AUDUBON

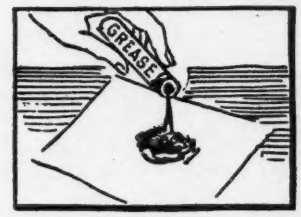
Floor Covering

moved, and several units can be handled

Protect Essential Foods

Withstands boiling

It's Grease-resisting. Boil-proof



Resists grease

With food playing such a vital role in the war, every ounce must get utmost protection—must reach its objective fresh and wholesome. That's where Patapar* Vegetable Parchment comes in. This paper has double protective qualities. It withstands *both* moisture and grease. Soak it in water—even *boil* it, and it will remain firm and strong. Pour grease on it, then rub and see how it resists penetration.

*Reg. U.S. Pat. Off.

War Time Packages Patapar Lined

War demands and shortages have resulted in important new uses of Patapar. For example, many foods formerly put up in tin cans are now being packed in special containers fortified with inner liners of Patapar.

Patapar Used In Emergency Fishing Kits

As an aid to shipwrecked men, a watertight kit has been developed containing complete fishing equipment. Directions for using the kit must be printed on paper that can stand wetting. Patapar was tested in salt water for weeks, dried and found intact. It got the job.

Room for one more ?

Hot Weather Ahead!

Food Wrappers Face Severe Test

Heat brings moisture and grease to the surface of foods. This surface moisture and grease can work fast on wrappers causing them to "fog up"—disintegrate—leak. The result: spoilage. The way to avoid hot weather trouble is to use a wrapper that withstands both moisture and grease—like Patapar.

With its unique characteristics Patapar has come to the aid of literally hundreds of products that have presented packaging problems.

In hot weather or cold you can count on Patapar to keep foods wholesome and appetizing.

Are YOU Faced With A War Packaging Problem?

Maybe Patapar can help you. For full information write us outlining your problem in detail.

To Users of Patapar:

Paterson Parchment Paper Company

Parchment since 1885

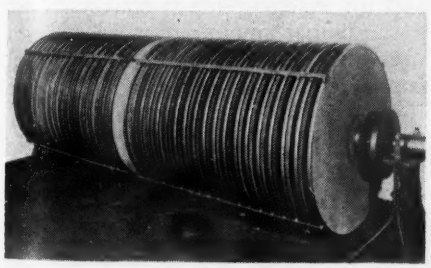
Vegetable-Base Adhesive

Floor Covering

SPRAYED or troweled on over metal, wood, concrete or other floorings, "Dek-tred," produced by Goodyear Tire & Rubber Co., Akron, Ohio, is said to be resistant to the action of oils, greases, gasoline, salt and cleansing materials such as soap. It also has high non-slip properties. When placed in proper thickness and allowed to dry for at least eight hours, it will withstand heavy traffic. As it is self-leveling, repairs can be made without the appearance of patching. A single covering of about one-thirty-second of an inch thickness weighs 1.5 oz. per sq.ft. when dry.

Clarification Filter

A STURDIER leaf design than heretofore developed has been incorporated in a new rotary leaf clarification filter built by Swenson Evaporator Co., Div. of Whiting Corp., Harvey, Ill. The leaf is specially designed to produce a uniform tautness of screen, giving longer screen



New design of rotary leaf clarification filter

life and eliminating need for clamping rings and bolts. The unit illustrated contains 40 leaves of 44½ in. diameter.

Hopper Attachment For Truck

To make possible a standard method of handling bulk materials by factory truck, Towmotor Corp., 1226 East 152nd St., Cleveland, Ohio, has developed a hopper attachment for its standard lift truck models of the fork type. This hopper is available in various sizes. To provide a firm carrying position and permit rapid tilting in dumping hopper loads, the attachment is carried directly on the fork support bar of the lift truck by means of a hook arrangement which is an integral part of the hopper. The

guide and the arrangement of the seam unit are claimed to assure tight, positive closure for the carton top. The

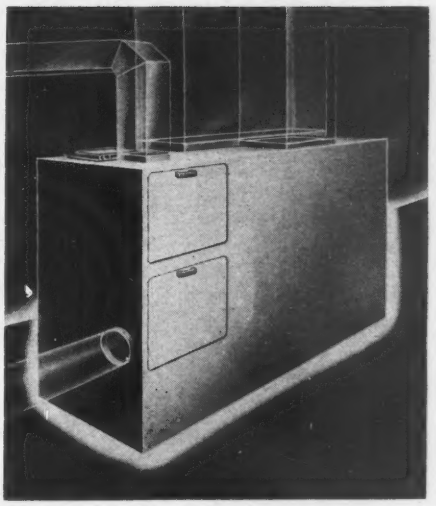
moved, and several units can be handled in turn by one truck, one being moved and discharged while the others are filling.

Removable Liner Pump

IN order to save critical materials from which its rotary pumps are made, Blackmer Pump Co., Grand Rapids, Mich., has announced a rotary pump with removable liner. This is designed like all Blackmer standard rotary pumps, but, when wear affects its capacity, the liner can be removed and replaced with a new one. To do this, involves only removal of the pump heads, driving out the old liner and inserting the new, without disturbing the pump or piping. No fitting is necessary, as the buckets are self-adjusting.

Humidity Control Units

SURFACE COMBUSTION CORP., Toledo, Ohio, has brought out a "package" series of "Kathabar" dehumidifying units, suitable for dehydrated food processing, packaging and storage. In the past, this system has been available only in large central units ranging up to capacities of 100,000 cu.ft. per minute. The new "package" units are available in sizes of 750, 1,500, 3,500 and 5,000 cu.ft. per minute. They are suitable for maintained desired relative humidities not only in dehydrated food manufacture but also in the storage of cereal products, fruits, vegetables, and other foods. In one installation in a dehy-

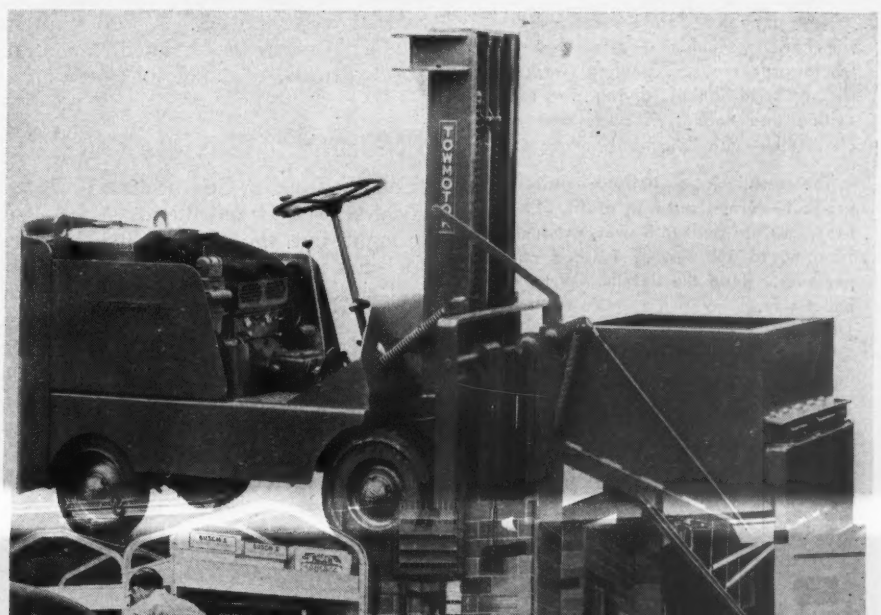


"Package" unit for dehumidifying

drated food plant, after the food has been reduced to a low moisture content in a dehydrater, it is stored in a "Kathabar" conditioned atmosphere, in which further reduction in moisture is made. Storage in this manner also avoids moisture regain.

Truck Enamel

S. C. JOHNSON & SON, INC., Racine, Wis., has brought out a wax-fortified enamel specially developed for exterior painting jobs on such equipment as dairy and bakery trucks. Because of its wax content, it is claimed that this enamel has unusual qualities of ruggedness, good appearance and easy maintenance. It is made for application with



Crisp, Nut-Like AND Profitable

Crispness and the tasty, nut-like flavor of potato chips produced by the

FERRY CONTINUOUS POTATO-CHIP MACHINE

are automatically maintained — hour after hour and day after day.

Raw, unpeeled potatoes are fed into the FERRY Machine — after that the whole process . . . peeling, washing, slicing, conditioning, drying, frying, salting and cooling is performed mechanically—with "push-button" control.

The result is a uniform superfine product—turned out with profit. FERRY Machines are built in 5 sizes, producing from 50 to 350 lbs. of finished chips per hour. Read the details. Write for Bulletin FI.

ALSO MAKERS OF:
SLICERS AND AUTOMATIC SLICER FEEDERS, CAN WASHING MACHINERY

J. D. FERRY CO.

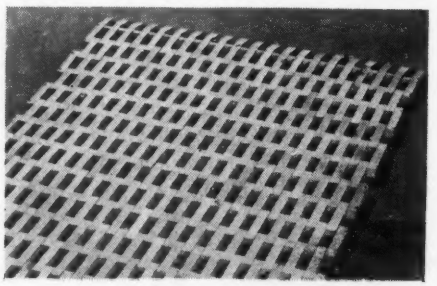
...RECKMAN, or equal...

Vegetable-Base Adhesive

PAISLEY PRODUCTS, INC., has brought out a line of vegetable-base adhesives under the trade name of "Vegimal." These can be applied by machine or brush. The products are viscous, light tan colored liquids, freely miscible with water, and weighing 10 lb. ger gal. They are made from domestic starches with added plasticizing chemicals that produce various drying or setting speeds. They are difficult to spread at room temperatures, but spread easily when heated to 125 deg. F.

Floor Mat of Wood

AMERICAN MAT CORP., 1797 Adams St., Toledo, Ohio, has developed a wood-link floor mat to replace floor mats made from rubber or other materials restricted because of the war. The new product, called "Flexible Wood Link Matting," is light in weight and



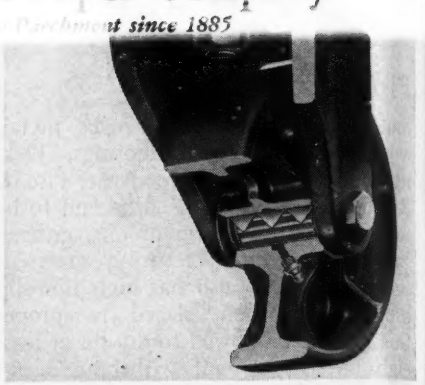
Floor mat made of wood links.

can be rolled or folded for easy handling and cleaning. It comes in natural wood color, is 1 in. thick and stock sizes are 18x32 in., 24x38 in., and 30x44 in. Special sizes up to 36 in. wide and in any length can be obtained. Ends are beveled to reduce danger of tripping.

Equipment Casters

RAPID-STANDARD CO., INC., 535 Bond Ave., N. W., Grand Rapids, Mich., has brought out the "Nicro Steel" caster for such portable equipment as pumps and tanks. It embodies an adaptation of "Nicro Steel" castings to new principles of caster design, including two complete large diameter ball raceways. The strength of the materials permits a long lead or "rake," the basis of easy swiveling.

These casters can be furnished with either metal or ABK Resinoid floor-protective wheels. Roller bearings are



New design of caster employing "Nicro Steel" castings

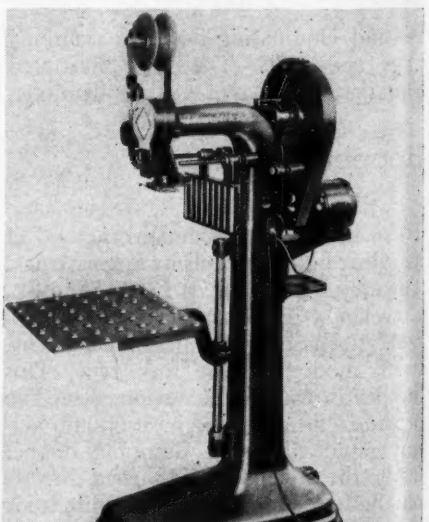
from 3 in. to 5 in. diameter. Pressure lubrication fittings are provided in both swivel and wheels.

Screw Conveyor Trough

LINK-BELT CO., 307 N. Michigan Ave., Chicago, has developed a screw conveyor trough that is a combination of steel bottom, wooden sides and wooden cover—lag-screwed together to form a complete, tight enclosure for the screw and the material that it conveys. Thus a substantial amount of steel is saved over what would be needed for all-steel construction. A further advantage is that the steel bottom can be readily removed for access and cleaning.

High Speed Carton Stitcher

ACME STEEL CO., 2840 Archer Ave., Chicago, has brought out the "Seam



can be obtained by using larger floats and longer float arms.

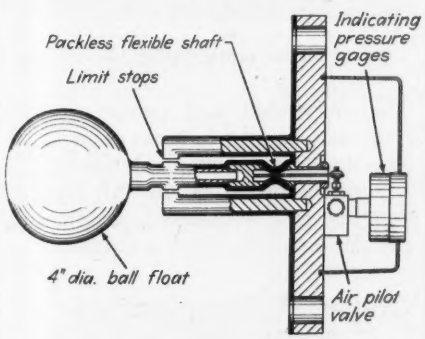
Elliptical steel floats having ⅛-in. rub-

guide and the arrangement of the seam unit are claimed to assure tight, positive closure for the carton top. The machine is designed to form and drive as many as 285 steel stitches per minute, drawing the material from a 10-lb. spool of wire. A solenoid control is provided for starting or stopping the stitching mechanism.

An overlap style container is suggested for use with this seam stitcher. To complete the stitching operation, the carton flaps are slipped through the open head device. Since the table and the vertical roller guide are adjustable, the machine can accommodate containers of varying depths and widths.

Liquid Lever Controller

Moore Products Co., H and Lycomings Sts., Philadelphia, Pa., is making a completely rubber or Neoprene covered liquid level controller designed for installation in a standard rubber covered tee fitting, or for direct mounting in a tank containing corrosive liquid. A rubber covered flexible steel shaft avoids any necessity for packing glands or bearings, and also provides a simple, friction-free method of transmitting the float motion to an air pilot valve or micro-switch, as desired.



Sketch of rubber covered liquid level controller

The flexible shaft consists of a formed tube similar to a Bourdon tube. A flat lever inside this tube connects directly with the air pilot valve or microswitch for controlling the liquid level. Operation is said to be unaffected by wide variations of pressure and temperature.

The controller operates on the principle of force change due to buoyancy and is said to have a sensitivity such that a buoyancy change of less than 8 oz. [illegible] plate glass window. Another hinged cover is provided for access to the dry ice compartment, which has a capacity

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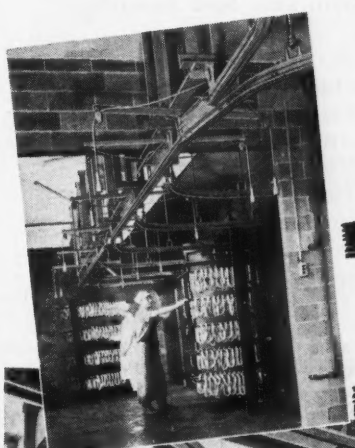

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D. FERRY CO.

either metal or ABK Resinoid floor-protective wheels. Roller bearings are

Type: BECKMAN, or equal

be rugged

THERE *IS* NO EQUAL TO *Beckman* pH EQUIPMENT

Why?

...*because* with no other make of modern pH equipment can you maintain *continuous* pH control on boiling-hot liquids!

Only Beckman has developed High Temperature Glass Electrodes that can be immersed directly in tanks, flow lines, etc. (no sampling devices required) for continuous operation in process solutions up to 212° F. (100° C.).

...*because* with no other make of pH equipment can you maintain *continuous* pH control in highly alkaline solutions, *even in the presence of sodium ions.*

Beckman alone has perfected High pH Glass Electrodes which permit accurate pH control in the high pH ranges even when sodium compounds are present. This important feature has extended the usefulness and benefits of modern pH control to entirely new fields where alkaline solutions, in combination with sodium ions, have heretofore presented difficulties.

...*because* with no other make of pH equipment can you maintain *continuous* and automatic check on as many as SIX different pH stations with only ONE pH instrument.

Only Beckman has perfected an Automatic Multiple Glass Electrode Switch for use with multiple station recorders to record pH from as many as *six* stations through *one* Beckman Automatic pH Indicator.

THESE are only a few of the *many* exclusive pH developments made by the Beckman research staff... developments that are so fundamental and far-reaching that they antiquate all other pH equipment. So for your own protection, when you specify pH equipment, make sure you get BECKMAN. *There is no "equal"!*

LET OUR ENGINEERING STAFF HELP YOU in adapting Beckman pH control to speeding up your production... cutting waste... reducing corrosion... and increasing the overall efficiency of your processing operations. If you use water or water solutions anywhere in your plant operations, investigate! Beckman Instruments Division, National Technical Laboratories, South Pasadena, California.

What Every Executive Should Know About pH

Send for this helpful booklet that explains the fundamentals of pH control—what it is, how it's used, where it fits into modern production processes. IT'S FREE!

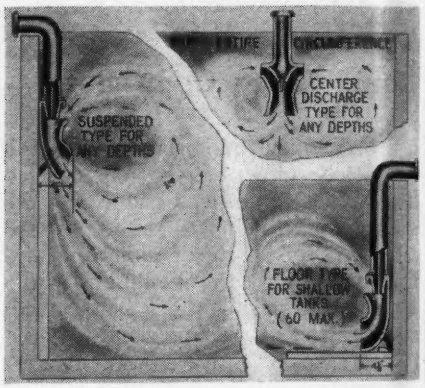
BECKMAN

and longer float arms.

Elliptical steel floats having ⅛-in. rubber covering are used where wider level changes are desirable. Rubber covered stops are provided to keep the flexible shaft well within its elastic limit.

Circulating Steam Jets

THREE new circulating steam jets have been announced by The Duriron Co., Dayton, Ohio. Besides being corrosion resistant, these jets are said to have the advantage of fitting snugly to the inside walls of either square or circular tanks, with a maximum projection of 4½ in.



Steam jet for agitating liquids in tanks.

The suspended and center discharge types may be used in tanks of any depth. The floor type is adaptable for tanks of any depth up to 60 in. All types are designed to give complete agitation and circulation of the tank contents.

Constant Temperature Cabinet

FOR USE in laboratories requiring refrigeration, American Instrument Co., Silver Spring, Md., has designed a constant temperature dry ice cabinet. Providing temperatures from −90 deg. F. up to 220 deg. F., with a constancy of plus or minus 0.5 deg. F., it is intended for use where mechanical refrigeration is not justified. It is available in two ranges: 0 deg. F. to −90 deg. F., and 220 deg. F. to −90 deg. F.

Temperatures of −65 deg. F. and −90 deg. F. are attained in 15 and 30 minutes, respectively, from an initial temperature of 85 deg. F. Temperatures can be held at −40 deg. F. and −90 deg. F. in an ambient temperature of 85 deg. F. for 24 hours with 40 lb. and 60 lb. of dry ice, respectively.

The cabinet is portable. It is ex

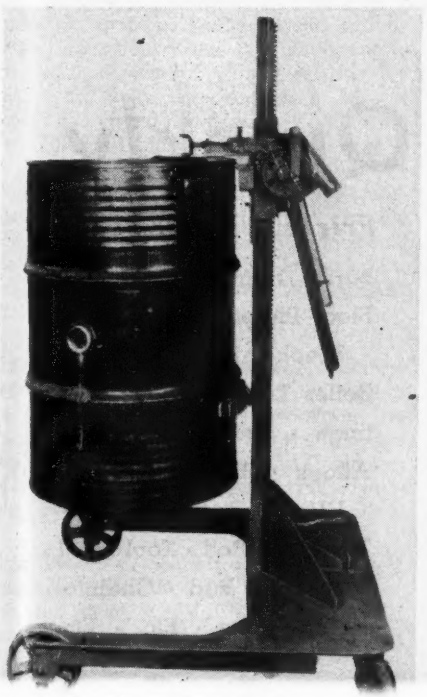
plate glass window. Another hinged cover is provided for access to the dry ice compartment, which has a capacity of 75 lb. Air is circulated by means of a fan, below the dry ice compartment.

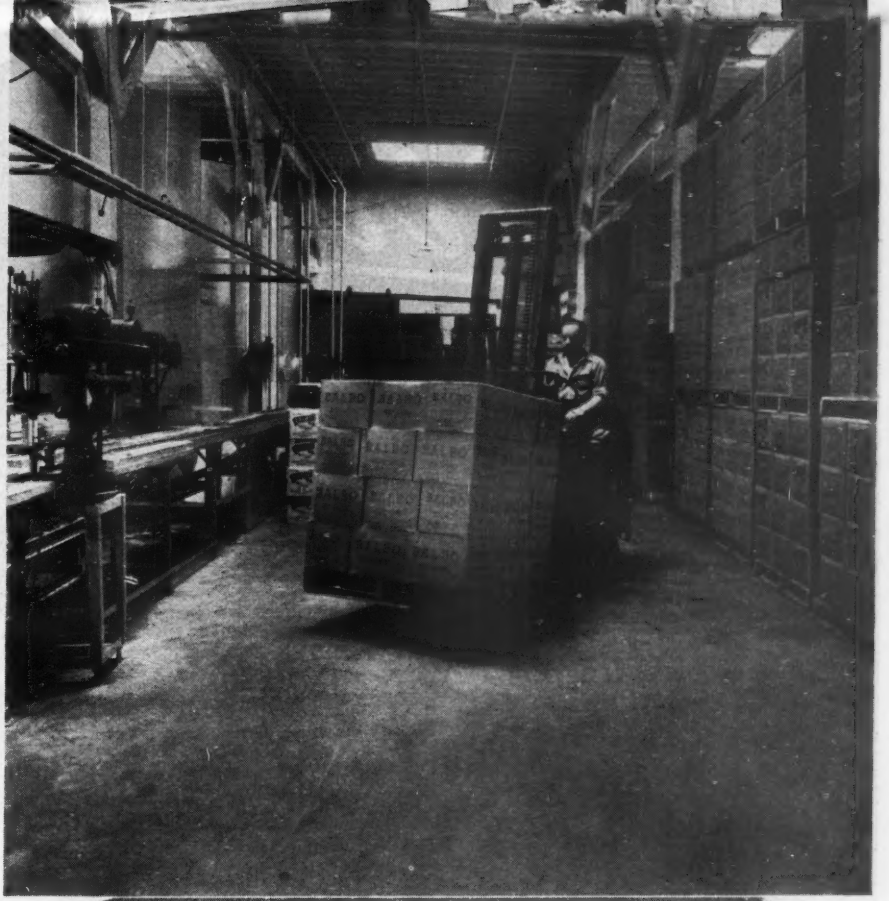
Traffic Zoning Paint

THOMSON-PORCELITE PAINT CO., 829 No. Third St., Philadelphia, Pa., has developed "Porcelite" traffic zoning paint, for highly permanent and visible floor and drive markings. This paint can be applied to wood, stone, asphalt, composition and cement and is said to do the marking job in one coat.

Drum Carrier

ERNST CARRIER SALES CO., 1456 Jefferson Ave., Buffalo, N. Y., has introduced the 14 in. Lift Model Ernst Carrier with built-in brake, for placing and removing 55-gal. drums or barrels on and off skids, scales and platforms. The brake feature is claimed to provide smooth, slow and easy lowering of the container from top position. To raise the container the full 14 in. off the floor, the handle is lowered from the up position to the horizontal position, where it automatically locks. To lower the container, the handle is unlocked and the brake applied. An advantage claimed is operation by one man. Capacity is 700 pounds.





One trip does the Trick!

COUNT those cartons. That's right . . . 36, but they're all moved and stacked as a single load! In one trip Towmotor carries unit loads as heavy as 10,000 pounds from packing to storage at speeds as fast as 880 feet a minute . . . and then stacks them as high as 25 feet!

It will pay you to learn how and why a streamlined system of materials handling saves you time and money at every turn. You'll find ideas galore in "The Inside Story." For a free copy write Towmotor Corporation, 1222 E. 152nd Street, Cleveland, Ohio.

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85 deg. F. for 24 hours with 40 lb. and 60 lb. of dry ice, respectively.

The cabinet is portable. It is ...

basic importance to food plant oper...tion.

Among the 27 chapters in the book, of particular interest are those on the

Food Facts and Faults

FOOD FOR PEOPLE. By Margaret G. ...

...eir po...war ...am...ag. ...ne o...ers will be useful as pointers to the type of thinking that must be counteracted by

FOOD PLANT EQUIPMENT

Canning Equipment—A new edition of its complete catalog of canning machinery and supplies has been issued as the 190-page illustrated Catalog No. 700 by A. K. Robins & Co., Inc., Lombard & Concord Sts., Baltimore, Md.

Conveyor Equipment—An 8-page illustrated booklet, No. 2067, listing the sizes of cast tooth sprocket wheels, their prices, dimensions and weights, has been published by Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

Conveyors—A descriptive 16-page catalog illustrating various models, accessories, applications and specifications of conveyors essential to the war program, has been published under the title "Lamson Roller Gravity Conveyors," by Lamson Corp., Syracuse, N. Y.

Deaerating Equipment—A comprehensive 36-page catalog of various types of deaerators, together with cross section photographs, line diagrams in color, and illustrations of various designs constructed to meet space limitations, has been issued as Publication No. 3005, by Cochrane Corp., 17th & Allegheny Ave., Philadelphia, Pa.

Dehumidifiers — "Kathabar" dehumidifiers, for use in air conditioning systems and industrial operations where it is important to have accurate control of the relative humidity, are fully described in a 14-page booklet published by Surface Combustion Co., Toledo, Ohio.

Heat Exchangers—"Introducing Downingtown Shellfin Heat Exchangers" is the title of the illustrated pamphlet discussing the multiple installation of Shellfin units, issued by Downingtown Iron Works, Heat Transfer Division, Downingtown, Pa.

Materials Handling Equipment — Specifications and dimensions are given and various types of portable stackers and conveyors are described and illustrated in the 12-page pamphlet, "Portable Stackers and Conveyors for Storage and Warehouse Service," published by Jeffrey Mfg. Co., Columbus, Ohio.

Metal Baskets—Twenty-two types of baskets constructed of wire, wire mesh cloth, or expanded metal, used in such processes and operations as blanching, cleaning, paraffining and pickling, are illustrated in the brief 4-page pamphlet "What's Your Basket

air conditioning and refrigeration equipment are illustrated in the 20-page booklet, WP-1099-B37, entitled "Equipment for the Process Industries," by Worthington Pump & Machinery Corp., Harrison, N. J.

Refrigeration Equipment—"Perfect Refrigeration for Food Storage Rooms," Catalog 22, Section 6-A, which describes and illustrates the use of the Dole vacuum cold plate evaporator for refrigeration of food products, has been published by Dole Refrigerating Co., 5910 N. Pulaski Road, Chicago, Ill.

PLANT SUPPLIES

Brazing Alloys—"Sil-Fos and Easy Flo" is the title of an 18-page catalog, No. 12-A, which describes how the brazing of metals may be applied to equipment for operations such as refrigeration, heat exchange and air conditioning; issued by Handy & Harman, 82 Fulton St., New York, N. Y.

Corrugated Materials—Ingenious methods that can quickly provide simple and attractive wartime window displays are illustrated in the 11-page booklet, "Sherman Display Guide," published by Sherman Paper Products Corp., Newton Upper Falls, Mass.

Filter Cloths—Representative samples of cotton, wool, woven glass and synthetic filaments fabricated to produce acid-proof, alkaline-proof and high temperature resistant filter cloths for industrial filtration, are illustrated in a bulletin, "Filter Cloths," issued by William W. Stanley Co., Inc., 401 Broadway, New York, N. Y.

Power Transformers—"Power Transformers for Mercury-Arc Rectifiers" describes and illustrates the interior and exterior construction of two G-E mercury-arc rectifier transformers, typical of sizes both above and below 1,000 kw.; published by General Electric Co., Schenectady, N. Y.

Protective Equipment—Illustrations and descriptions of head and body protection for men and women industrial workers appear in the 4-page Bulletin 143 issued by Strauss Co., 925 Liberty Ave., Pittsburgh, Pa.

Record Card—Available to all maintenance engineers, a motor record card, GES-1536A, 4x6 in., for the recording of essential information on each motor, has been issued by General Electric Co., Schenectady, N. Y.

Switches Constructed as a single unit in-

Wash., to Food Machinery Corp., San Jose, Calif. No. 2,313,051. March 9, 1943.

Variegated Composition Ice Creams Packa-

PACKAGING

Labeling Equipment—The mechanical application of labels to bottled and packaged goods is illustrated in the pamphlets, "A Quality Machine in Every Particular" and "The New Ermold Labeler"; published by Edward Ermold Co., Hudson, Gansevoort & Thirteenth Sts., New York, N. Y.

Packaging Machines—Two types of package filling machines, built of hardwood and requiring a minimum of strategic metals, together with sealing machines of similar construction, are discussed in a leaflet, "Triangle Victory Model Packaging Machines," issued by Triangle Package Machinery Co., 906-914 N. Spaulding Ave., Chicago, Ill.

MISCELLANEOUS

Brewing—"Technical Material for Brewing" is the title of a 16-page booklet summarizing the principal technical products that help overcome difficulties in the production of fine beers; published by Wahl Institute, Inc., 58 West Jackson Blvd., Chicago, Ill.

Dairy Sanitation—Vital wartime data on safe, successful, milkstone-removal technics designed for saving manhours, increasing sanitation efficiency and conserving milk and milk product processing and handling equipment are given in a 12-page manual, "Oakite Milkstone Remover," released by Oakite Products, Inc., 22 Thames St., New York, N. Y.

Fishing Sanitation—Various essential wartime sanitation and maintenance technics utilized in the fishing industry to facilitate cleaning, conserve man power and increase efficiency are concisely described in a 10-page pamphlet published by Oakite Products Inc., 22 Thames St., New York, N. Y.

Research Laboratories—"Service at your Service" is the title of a 12-page booklet prepared for plant managers and technologists describing the scientific services offered by Food Research Laboratories, Inc., 48-14 33rd St., Long Island City, N. Y.

Rubber Conservation—To assist in mechanical rubber conservation, a booklet "How to Lengthen the Life of Mechanical Rubber Goods," describing in 21-pages ways to increase service from rubber belting and hose, has been issued by Pioneer Rubber Mills, 353 Sacramento St., San Francisco, Calif.

Testing Equipment.—A portable test kit for

Fat-soluble Vitamins A and D Incorporated into Aqueous Medium—Loran O. Buxton, Harrison, and Sol T. Lipsius, Newark, N. J., to National Oil Products Co., Harrison,

Food Facts and Faults

FOOD FOR PEOPLE. By Margaret G. Reid. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y., 1943. 653 pages; 9¼x6 in.; cloth. Price, $4.

Here's a book that men in responsible positions in the food processing industries ought to read—for two reasons. First, it gives a broad, though concise, picture of the present economics and possible future trends in respect to food distribution, including legislation and regulations affecting the industry's operations. Secondly, and more important, this is one of those books that food men must know about in order to understand the influence that it may have on the thinking of food consumers and especially the organized consumer groups.

New-Deal type of thinking about the need for improvements in food marketing efficiency, the value of controls and restraints and need for better nutritional standards is reflected in the author's writings. Some of the contentions will stand up, while others are debatable. Those which are sound will be valuable to food executives in their po[illegible]war [illegible]ng. [illegible]e o[illegible]ers will be useful as pointers to the type of thinking that must be counteracted by the food industries through the medium of publicity, advertising and contact with government food officials and consumer groups.

Bacteriology for Beginners

FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY. By A. J. Salle. Published by McGraw-Hill Book Co., 330 W. 42d St., New York, N. Y., 1943. 617 pages; 6½x9¼ in., cloth. Price, $4.

Because of the importance of bacteriology in food processing, technologists and others who direct the operations in food plants need at least a working understanding of the subject. And here is a book that can go far toward giving them such an understanding. It is written for those who are beginning the study of bacteriology and is concerned chiefly with a discussion of the important principles and facts of bacteriology upon which to base an advanced study of the subject.

Knowledge of chemistry is necessary for a thorough understanding of the basic importance to food plant oper[illegible]tion.

Among the 27 chapters in the book, of particular interest are those on the bacteriology of food, milk and milk products, and water and air; yeasts and molds; enzymes of bacteria; the decomposition and putrefaction of proteins; the fermentation of carbohydrates and related compounds; sterilization, disinfection and disinfectants; and the effect of environment upon bacteria.

Now in its second edition, the book has been completely revised and entirely rewritten to include the advancements that have taken place in all phases of bacteriology.

Facts of Food Poisoning

FOOD POISONING. By G. M. Black. Published by the University of Chicago Press, 5750 Ellis Ave., Chicago, Ill., 1943. 132 pages; 6x9¼ in.; cloth. Price, $2.

The ever-impending threat of suits against food packers in alleged cases of food poisoning makes this scientific and historical discussion of the subject of practical value to food companies and their legal departments or representatives. The author covers chemical poisoning in food, poisonous plants and animals, botulism, staphylococcus food poisoning, salmonella, alpha-type streptococci in relation to food poisoning, the significance of other bacteria in food poisoning and infections differentiated from food poisoning. The author approaches his subject from the view point of the physician.

The historical data cited are evidence of the safety of commercially processed foods. For instance, in 359 outbreaks of botulism in the United States between 1899 and 1941, only 44 are attributed to commercial foods.

Small-Scale Dehydration

DEHYDRATION OF FRUITS AND VEGETABLES AND UTILIZATION OF DEHYDRATED PRODUCTS. By J. C. Woodroof, W. E. DuPree and Helen H. Thompson. Published as Bulletin 225 by Georgia Experiment Station, Experiment, Ga. 1943. 35 pages; 6x9 in.; paper. Free.

Information useful in small-scale dehydration is presented in this bulletin, including how to prepare fruits and vegetables, how to dehydrate and how to package, store and rehydrate. A table lists various fruits and vegetables, gives the varieties suitable for dehy[illegible]

YARWAY Spray Nozzles

INVOLUTE TYPE FOR CONE-SHAPED SPRAY

for WASHING • RINSING • COOLING • HUMIDIFYING

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Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Many thousands in use. Write for literature.

YARNALL-WARING CO., 127 Mermaid Ave.

FAN TYPE FOR FLAT SLICING SPRAY

Natural Casings Tenderized by Controlled Enzymatic Action—Cleo A. Rinehart, to Industrial Patents Corp., Chicago, Ill.

Fat-soluble Vitamins A and D Incorporated into Aqueous Medium—Loran O. Buxton, Harrison, and Sol T. Lipsius, Newark, N. J., to National Oil Products Co., Harrison, N. J. No. 2,311,517. Feb. 16, 1943.

Fruit Mechanically Marked in Continuous Manner—Harold J. Mumma, Glendale, and Zenas Leonard, Burbank, Calif. No. 2,311,563. Feb. 16, 1943.

Cream Treated With Molecularly Dehydrated Phosphate in Ratio of ⅛ to 2 Oz. Per 10 Gal. Preliminary to Churning to Make Butter—Charles Schwartz, to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2,311,598. Feb. 16, 1943.

Cultured Buttermilk Made to Contain Small Amount of Molecularly Dehydrated Phosphate to Improve Flavor and Minimize Whey-ing—Charles Schwartz, to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2,311,599. Feb. 16, 1943.

Fish Oils Deodorized by Hydrogenating at Normal Temperatures and Elevated Pressures in Presence of Catalyst Followed by Aeration With Nonreactive Gas—James G. Blasco, East Elmhurst, N. Y., to Natural Vitamins Corp. No. 2,311,633. Feb. 23, 1943.

Confections Coated on Top and Bottom Ends With Aid of Mechanical Device—Carl R. Taylor, Cleveland Heights, Ohio, to Cream Cone Machine Co., Cleveland, Ohio. No. 2,311,709. Feb. 23, 1943.

Eggs Mechanically Graded on Weight Basis—William Chester Wyland, Albambra, Calif., to J. W. Wyland & Sons, Inc., San Gabriel, Calif. No. 2,311,722. Feb. 23, 1943.

Meat Ground and Mechanically Shaped Into Cylindrical Packaged Form Preparatory to Slicing Into Disk-like or Patty-shaped Units—Harry S. Lee, Plymouth, Mich. No. 2,311,843. Feb. 23, 1943.

Sucker-type Confections Frozen in Molds Shaped to Permit Removal Without Breaking or Distorting Stick Handle—Warren E. Neilson, York, Pa. No. 2,312,046. Feb. 23, 1943.

Hood Caps Applied to Filled and Sealed Bottles by Mechanical Means—Isaac A. Wilcox, to Oswego Falls Corp., Fulton, N. Y. No. 2,312,141. Feb. 23, 1943.

Oxygen-containing Air Swept From Partially Filled Carbonated Beverage Bottles by Causing Foam to Form Through Release of Gas Under Pressure—Charles Schmutzer, Irvington, and Kurt Manrodt, Newark, N. J., to Hoffman Beverage Co., Newark, N. J. No. 2,312,288. Feb. 23, 1943.

Flour and Other Grain Products in Bulk Freed From Insect Infestation by Compacting Product to Half Prior Volume Through Application of Centrifugal and Centripetal Forces and Subjecting to Disruptive Electrical Discharge—Franklin S. Smith, New Haven, Conn. No. 2,312,368. March 2, 1943.

Casein Curd Containing Not Over 70 Percent Moisture Mixed With Dry Powdered Sodium Fluoride to Produce Stable Granular Product Adaptable for Shipment in Bags—Francis Clarke Atwood, to Atlantic Research Associates, Inc., Newtonville, Mass. No. 2,312,467. March 2, 1943.

Liquid Food Material Containing Heat Coaguable Protein Subjected to at Least Two Heat Zones in Course of Drying—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,312,474. March 2, 1943.

Salad Dressing Emulsion Given Enhanced Smoothness and Increased Stability Through Addition of Carob Gum and Edible Organic Acid—Morris H. Joffe, to Emulsol Corp., Chicago, Ill. No. 2,313,033. March 2, 1943.

Normally Dry Material Sterilized by Heat-

-owed by Heating to as High as 240 Deg

Wash., to Food Machinery Corp., San Jose, Calif. No. 2,313,051. March 9, 1943.

Variegated Composition Ice Creams Packaged in Predetermined Ratio in Individual Container by Mechanically Controlled Proportioning—Aaron Friedman, to Joe Lowe Corp., New York, N. Y. No. 2,313,060. March 9, 1943.

Meat Products Forced Into Casings Under Suction Instead of Applied Pressure—John E. Dyrek, to Armour and Co., Chicago, Ill. No. 2,313,229. March 9, 1943.

Starch-making Residues Made to Contain Yeast, Water-soluble Grain Protein, and Phosphorus-containing Derivative as High Nutritive Ingredient for Animal Feed—Herman H. Schopmeyer, Hammond, Ind., to American Maize-Products Co. No. 2,313,275. March 9, 1943.

Corn Steep-water Processed for Recovery of Iron Phytate—Herman H. Schopmeyer, Hammond, Ind., and Gordon V. Sharps, Chicago, Ill., to American Maize-Products Co. No. 2,313,276. March 9, 1943.

Sausage and Similar Meat Products Packaged in Casing-like Containers Made by Impregnating Paper Tube With Grease-and-gelatine-free Fibrous Mass From Animal Hides Mixed With Tragacanth—Cenek Bednar, Neu-Rausnitz, Moravia, to Alien Property Custodian. No. 2,313,289. March 9, 1943.

Starch Suspensions and Hot Water Metered Simultaneously Into Mixing Chamber for Cooking of Starch in Continuous Manner—Charles F. Payne, to Eastman Kodak Co., Rochester, N. Y. No. 2,313,574. March 9, 1943.

Fats Hydrolyzed in Continuous Multiphase Counter-current Procedure—Baruch Winer, New York, N. Y. No. 2,313,692. March 9, 1943.

Chocolate Pastes Automatically Tempered in Continuous Manner—George Jack, Rochelle Park, N. J., to J. M. Lehmann Co., Inc., New York, N. Y. No. 2,313,705. March 9, 1943.

Poultry Wings Mechanically Stripped During Dressing Operation—Joseph E. Ringrose, Redmond, Ore. No. 2,313,770. March 16, 1943.

Papaya Latex Processed for Recovery of Proteolytic Enzymes—Eugene F. Jansen, Takoma Park, Md., and Arnold K. Balls, Washington, D. C., to the people of the United States. No. 2,313,875. March 16, 1943.

Drupe Fruits Mechanically Halved and Pitted—Frank C. Silva, San Jose, Calif. No. 2,313,898. March 16, 1943.

Doughnut Batter Mechanically Extruded Through Double-acting Valve Depositor—Alexander S. T. Lagaard, to Dough-King, Inc., Minneapolis, Minn. No. 2,313,949. March 16, 1943.

Leavening Agent Comprised of Crystallized Anhydrous Calcium Acid Pyrophosphate and Monocalcium Orthophosphate in Proportions to React Slowly With Sodium Bicarbonate—Arthur E. Huff, Lemay, Mo., to Monsanto Chemical Co., St. Louis, Mo. No. 2,314,090. March 16, 1943.

Ergosterol and Similar Activatible Material Treated to Impart Antirachitic Property—Lester F. Borchardt, to General Mills, Inc., Minneapolis, Minn. No. 2,314,119. March 16, 1943.

Milk and Similar Liquids Spray-dried by Method That Supplies Drying Gas to Outer Periphery of Drying Space to Give It Cyclonic Movement—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,314,159. March 16, 1943.

Cereal Grain Germs Freed From Oil Content Without Impairment of Vitamin B Content

—Ezra Levin, Chicago, Ill. No. 2,314,202.

What's Wrong with Baking

Now I think that Senator Reed may be a bit too enthusiastic about claim-

Testing Equipment—A portable test kit for

efforts is indicative of more serious thought.

Primarily the administrative angle

IN DEMOCRATIC countries, police departments nab "bad actors" and keep them out of circulation. In food processing, we also encounter "bad actors"—elements and conditions that rob products of freshness, turn them rancid, destroy their flavor. But food technologists are already on their trail. They know, for example, that they must protect food products from irradiation by light . . . exclude oxygen or excessive humidity . . . guard against insect infestation.

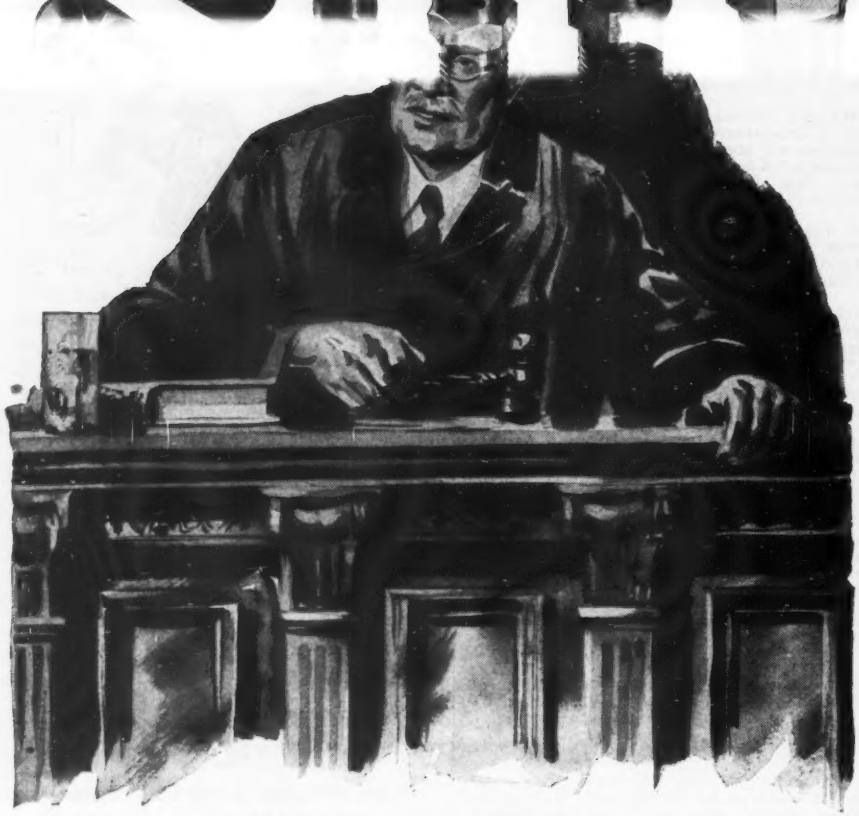
Recent research shows that copper and iron, even in minute traces, are "bad actors." In the manufacture of shortening, they are eliminated to increase rancidity resistance of fats and oils. They affect stability of dairy, bakery, and meat products—and practically any food that contains the slightest traces of fats or volatile flavors easily oxidized.

Yes, they even affect the stability of certain vitamins—Vitamin "C," for example, and some of the "B" group.

We have reduced the copper and iron in Diamond Crystal Salt until today they represent less than 1 part per million. Salt products in general, however, may contain significant amounts of both copper and iron.

NEED HELP? HERE IT IS!

Why not check up on the salt you are now using? And if you would like our help in keeping the "bad actors," copper and iron, down to a minimum in your plant, drop a note to our Director of Technical Service, Diamond Crystal, Dept. J-5, St. Clair, Michigan.



NEXT CASE:
U. S. vs.
225 BAGS OF FLOUR

"This product was contaminated with..." But you know the story. And again valuable food supplies are condemned...the product ordered destroyed...a manufacturer's reputation damaged...a valuable customer lost.

DON'T LET THIS HAPPEN TO YOUR PRODUCT!
FUMIGATE WITH LIQUID HCN

Let us recommend an Industrial Fumigation Engineer to survey *your* insect control problem. A consultation involves no obligation—and it may save you money! His experience in dealing with infestation problems under many varied conditions enables him to advise you on the most efficient method of insect control for your plant—one which will cause a minimum of interruption of production line.

Write us for more information on this special service or for the name of the Industrial Fumigation Engineer nearest you. Your inquiry will receive prompt attention.

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gives the varieties suitable for dehy-

Natural Casings Tenderized by Controlled Enzymatic Action—Cleo A. Rinehart, to Industrial Patents Corp., Chicago, Ill. No. 2,314,313. March 16, 1943.

Drawn Poultry Quick Frozen by Injection of Cold Air Into Body Cavity—Charles T. Walter, to Industrial Patents Corp., Chicago, Ill. No. 2,314,317. March 16, 1943.

Glyceride Oils Stabilized Against Oxidative Deterioration by Addition of Small Quantity of Phosphorus Derivative and of Polyhydroxy Aromatic Compound With Subsequent Heating to More Than 250 Deg. F. Under Less Than Atmospheric Pressure—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,314,364. March 23, 1943.

Glyceride Oils Stabilized Against Oxidative Deterioration by Addition of Small Quantity of Phosphorus Compound and of Gum Guaiac With Heating to Higher Than 250 Deg. F.—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,314,365. March 23, 1943.

Milk Deodorized and Vacuum Cooled on Continuous Basis—Henry Lamont Murray, Parnell, to Murray Deodorizers, Ltd., Auckland, New Zealand. No. 2,314,455. March 23, 1943.

Starch in Water Suspension Heat Treated at 73 to 100 Deg. C. and Dried to Give Cold-swelling Starch for Blancmange and Puddings—August Adolph Salzburg, to Dryfood, Ltd., London, England. No. 2,314,459. March 23, 1943.

Pulp of Fruits and Vegetables Freed From Dust and Dirt Content by Centrifuging—Samuel Levison, Chicago, Ill. No. 2,314,586. March 23, 1943.

Glyceride Oil Mixture Purified by Mixing With Agglomerant Having Water Content, Filter Cake With Retained Oil Content, and Adsorbent Substance With Affinity for Water Content of Agglomerant to Form Coagulate Which Separates From Oil—William Kelley, to Filtrol Co. of California, Los Angeles, Calif. No. 2,314,621. March 23, 1943.

Poultry Freed of Feathers by Mechanical Device Fitted With Rubber Teeth or Projections Which Rotate at Rapid Rate of Speed—Fred Hanshaw, Port Huron, Mich. No. 2,314,700. March 23, 1943.

Pineapples Graded for Size by Mechanical Means—Kermit J. Jackson, Honolulu, Territory of Hawaii. No. 2,314,704. March 23, 1943.

Canadian Patents

Natural Cheese Packaged in Wax-rubber Film Surrounded by Outer Vented Wrapper Sufficiently Impervious to Gas to Retain Portion Evolved From Cheese During Curing But Permitting Excess to Escape—Allen Abrams, Wausau, and Charley L. Wagner, Menasha, to Marathon Paper Mills Co., Rothschild, Wis. No. 410,531. Feb. 9, 1943.

Sugar Beet Juice Treated With Calcium Oxide Produced by Calcining Recovered Lime Cake Mixed With Calcium Oxide Obtained by Calcining Lime Rock—Robert Martin Daniels, to Holly Sugar Corp., Colorado Springs, Colo. No. 410,643. Feb. 16, 1943.

Concentrated Coffee Extract With High Aromatic Content Put into Soluble Dry Form by Mixing With Carbohydrates in Equal Quanties on Dry Solid Weight Basis—Max Rudolf Morgenthaler, Vevey, Switzerland, to Inredeco, Inc., Panama City, Panama. No. 410,645. Feb. 16, 1943.

Yeast Given Increased Vitamin B_1 Content by Propagation in Wort Containing Crystalline Vitamin B_1, Growth-promoting Factors, and Pyrimidine and Thiazole Derivatives—Alfred S. Schultz and Lawrence Atkin, Bronx, N. Y., and Charles N. Frey, Scars-

[illegible] limitation has yet been applied to most of these. Unfortunately, however, no

confess I do not have the figures, is this: and shortening, to provide a higher

What's Wrong with Baking

Since this letter was written, the ban on bread slicing has been lifted, making some of the writer's comments less pertinent. But the discussion of baking problems is so analytical that the writer's comments are still worth considering.—THE EDITORS.

To the Editor
of FOOD INDUSTRIES:

I was very much interested in finding two articles on the first three pages of the February FOOD INDUSTRIES referring to the baking industry. Inasmuch as my business has been in serving bakers over a 25-year period, I am happy to see that their position as a primary food industry is recognized by you to the extent of devoting considerable editorial space from time to time in discussions of their problems.

Specifically, in your two paragraphs on page 47 regarding the slicing furore, and your page 49 article on other OPA regulations, I rather sense that you have "missed the boat" on the former, but have on the whole presented a good logical case in the second article.

First, regarding the ban on slicing. I believe that facts will bear me out in the statement that while the annual per capita consumption of bread had decreased from its high point somewhere before the advent of sliced bread, it continued to decrease thereafter almost until the war began to have its effect on all food consumption. While it had its advantages in consumer service, by the admission of the majority of the bakers at its inception, it would provide this service at an additional cost which could not be realized by any price increases, because of consumer resistance and a government warning that increased bread prices were not justified under a declining flour market.

Other objections to slicing were that it would increase sales, both on the counter and in the housewife's pantry, and perhaps, save for a few over-enthusiastic proponents, few people thought that overall production would increase. As a matter of fact, universal bread slicing was forced on the baking industry as a necessary evil of competition. You may recall the hectic days when the competitive rate was for the longest loaf of bread, and the thinnest slice, which did more to reduce per capita

ing the winter and some stay there simply because they can secure a better and much easier return than anywhere

Now I think that Senator Reed may be a bit too enthusiastic about claiming anywhere near a 20 percent increase in bread consumption by home slicing. Personally, I believe that it may increase the total breadstuff consumption, but a lot of housewives are going to become discouraged in their attempts to slice bread successfully at home, and will turn to increased use of buns, rolls, biscuits and the like.

The shortage of household bread-slicing equipment is no joke. Cutlery manufacturers who 60 years ago could fill orders within 30 days are now six months behind. Their ability to secure blade steel is, of course, limited by war priorities. Bakers are cutting their old slicer blades in half and fitting them with handles to supply their customers with proper bread slicing equipment. Hardware stores, restaurants and bakers' supply houses are besieged with requests for good bread slicing knives. And what with the increase in consumption of hamburgers, cube steaks and prepared and tenderized meats, the family carving knife just isn't what it used to be.

efforts is indicative of more serious thought.

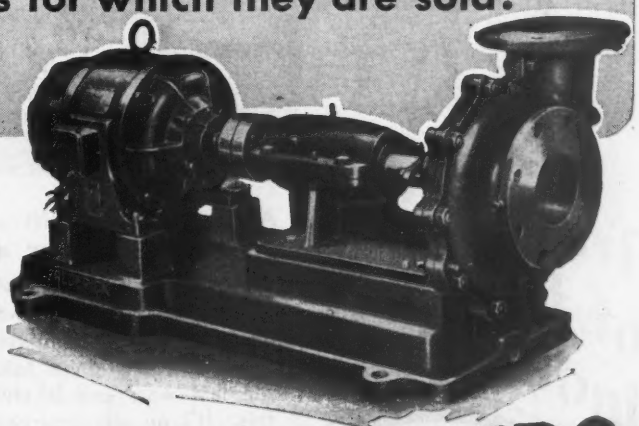
Primarily the administrative angle was that bread, being a basic living commodity, should be one of the foods over which the government should exercise extreme anti-inflationary control. Before the flour millers caused them to see otherwise, they felt that the flour ceiling was ample control. However, after stagnating the milling industry to the point where there was an actual shortage of flour amidst an abundance of wheat, it was necessary to shift the clamps and tighten them at another point.

Realizing that the baking industry might easily become aroused over such obvious unfair treatment, the next step was to offer an alteration of the bakers' cost structure by the elimination of slicing, twisting, double wrapping and stale returns.

Now right here I believe the bakers as a whole have been at fault in more or less emulating the farmers by hollering, not only when they are not helped but when they are. There is no question in the minds of those who look at the situation purely from the standpoint of total good to the industry

Available in the type, size and material best suited to your needs . . . . . .

GUARANTEED to meet the operating conditions for which they are sold!



Specially designed for efficient service in the food industries.

FREDERICK PUMPS

FREDERICK IRON & STEEL CO.

confess I do not have the figures, is this: How much in cents per pound of bread produced do the reduced costs of processing and distribution offset the increased cost of flour?

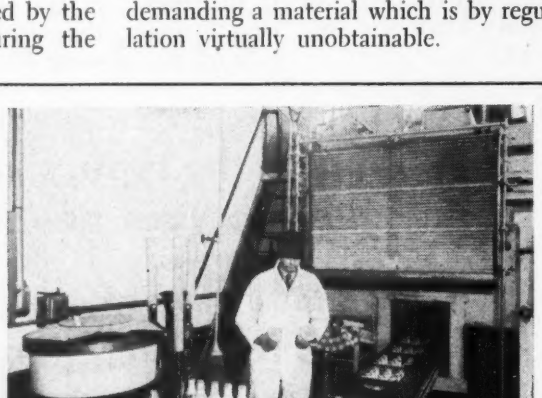
As you will recall in previous jousts with the administration, the bakers have advanced at various times the argument that (a) a decrease in flour cost is not sufficient to reduce bread prices markedly; (b) the application of the same wage-hour scale to the baking industry as to other industries would work a terrific added cost burden; (c) the cost of incidental items, such as milk, sugar, shortening, etc., has little influence on the cost per pound (and later on rising markets, and they are of more influence than flour costs). These conflicting statements and many others indicate that there has been an unfortunate lack of coordination in the baking industry, especially in its contact with political or governmental agencies.

Now, with reference to the so-called "degraded formula" which the OPA promulgates: No doubt on the basis of the high-quality bread produced by the majority of bread bakers during the and shortening, to provide a higher standard.

The very critical point in the OPA program, however, is not stated in your article. That is the regulation covering the sale and resale prices of all dry skim milk. This regulation allows a differential of only one cent per pound between the f.o.b. creamery price and the delivered consumer price. Heretofore, the greatest percentage of dry milk distribution to the bakers has been through distributors and jobbers who would be forced under this regulation to pay for delivery, sales cost and credit losses on a market that is normally considered insufficient to be interesting even to an f.o.b.-source basis.

As a consequence, even today many bakers are unable to secure sufficient milk (those farthest from milk processing plants suffering most) to maintain even the OPA minimum milk standard.

Far from objecting to a leaner formula, a greater number of bakers are wondering how they can legally stay in business in the face of a regulation demanding a material which is by regulation virtually unobtainable.



Trusted Ally of the Food Industries—

FRICK

An army fights on its stomach. So does a navy, a city, a factory, a home.

Adequate refrigeration is absolutely essential to the nation's food supply. For nearly 60 years the food industries have considered Frick refrigeration a favorite. It helped win the last war, and is still more important in this. It's an ally you can trust.

Let us quote on that cooling system you need.

FRICK CO., Waynesboro, Penna.

Chloride upon Strains of Food Poisoning ... onds in second speed, and 90 seconds in ... readily and quickly reconstituted with cold ...

Alfred S. Schultz and Lawrence Atkin, ... limitation has yet been applied to most of these. Unfortunately, however, no allowance is provided for the substitution of these items when the supply of the prescribed material is curtailed below the OPA minimum. Nor is any permission given to increase fats and sugars not otherwise limited by the use of these alternate materials.

Therefore, I think your point is well taken that OPA should have (and still should) consulted with the Defense, Health and Welfare Agency to determine what other articles may be permitted to enable the consumer to enjoy full protein, fat, sugar, mineral and good old-fashioned calories in his bread, and still provide Lend-Lease with its quota of milk and lard and sugar.—C. ALLEN HARPER, *James A. Harper Supply Co., Kansas City, Mo.*

War Industries Compete With Food Manufacturers

To the Editor
of FOOD INDUSTRIES:

On the lower right hand corner of page 43 of your March issue you say "Food plants cannot pay the high wages of munitions factories." Just why do you say that? Do you really think that a war can be won on munitions alone or are you, too, one of those who thinks that munitions should be allowed to run wild and that the food industry should continue on a normal basis?

In Rochester, about ten miles from here, we have several "war industry plants" which are apparently operating on a cost-plus basis, the higher their cost, the greater their return. As a result of this, many, if not all, are overstaffed and many, many employees are putting in full hours and doing about half or two-thirds of what they could do.

They are able to start anything that can walk at 65 cents per hour and in a very short time the 65 cents becomes 80 cents or more. There are times when they have to loaf because of a shortage of materials or some other difficulty of such nature.

It seems to us that the sensible thing to do is to insist that the munitions be produced on the same basis that farmers are expected to produce

ing the winter and some stay there simply because they can secure a better and much easier return than anywhere else.

The one redeeming feature for the farmer is that he will have food and the city man is going to be badly pinched in the near future.

With all of the headaches in the food business and the bother with a lot of inspectors who do not know the simplest rudiments of business or food processing, we are seriously inclined to think that we would be much better off to close shop and get one of these nice jobs where we could put on our hats at quitting time and go home and forget the plant.—M. F. HALLAUER, *Webster Canning & Preserving Co., Inc., Webster, N. Y.*

How Vegetables Can Be Preserved by Brining

(*Continued from page 66*)

but a few thousand bacteria. The color, whether fermented or unfermented, had changed from green to yellow. The texture was good.

General Summary

Preliminary results show that it is inadvisable to permit any fermentation in the case of peas. It takes at least a 70-deg. sal. brine for their preservation, and an even higher salt concentration is preferable. Corn can be preserved at lower brine concentrations than peas, since it ferments much more slowly and apparently is not harmed by fermentation. Green string beans and okra can be preserved with a brine concentration starting at 40 deg. sal., with the concentration being raised 2 deg. per week until 60 deg. sal. is reached. Fermentation apparently does no harm to the beans, but okra loses color. Green lima beans require a minimum salt concentration of at least 60 deg. sal., and preferably as high as 80 deg.

In general, when fermentation occurs there is loss of color, while there is almost no change in color when fermentation is nil. Blanched vegetables ferment more readily than unblanched.

Salting does not destroy catalase or peroxidase.

Quartermaster Corps Tentative Specification OQMG No. 12-A, "Packing for Over-

FREDERICK IRON & STEEL CO.

dehydrated FOODS

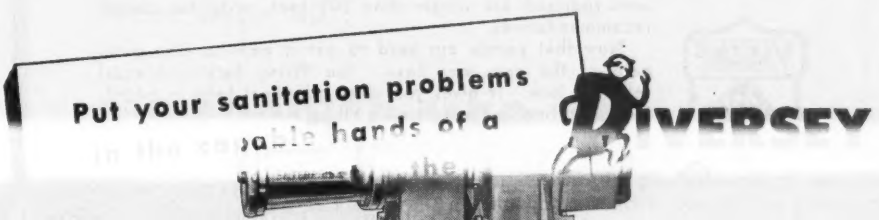
MAY NOT SHOW UP UNTIL WEEKS AFTER SHIPMENT

Careful sanitary measures necessary to safe-guard quality

The dehydration of foods has presented many new problems . . . often complicated by the lack of experienced workers. Of major importance, for example, are the problems of sanitation. Dehydrated foods as a rule cannot be sterilized in the package after packing. To avoid spoilage . . . to prevent off-tastes and off-flavors that may not show up until weeks after shipment . . . exacting measures of sanitation must be applied to all processing equipment.

Here's a timely suggestion: put *your* sanitation problems in the capable hands of a Diversey D-Man. A competent, trained specialist in food plant sanitation, the Diversey D-Man has a background of 17 years in serving the dairy industry, where rigid sanitation of diversified and complex equipment is imperative. Sanitation procedures developed by Diversey Research Technicians for the dairy industry . . . proven by years of practical experience . . . have already been successfully applied to the processing equipment employed in the dehydration of foods.

The Diversey D-Man will gladly make a detailed survey of your dehydration operations and submit specific recommendations that will assure maximum protection of quality . . . minimum risk of spoilage. His services are without cost or obligation. Just write to The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.



Acids and Sodium Chloride upon Strains of Food Poisoning Staphylococci, *American Journal of Public Health*, vol. 30, 1040, 1940.

4. F. W. Fabian and E. A. Johnson, Experimental Work on Cucumber Fermentation. Part IX. A Bacteriological Study of the Cause of Soft Pickles, Michigan Agricultural Experiment Station Technical Bulletin No. 157, 1938.

5. C. S. Pederson and C. D. Kelly, The Quality of Commercial Sauerkraut, New York State Agricultural Experiment Station Bulletin No. 613, September, 1932.

Army Specifications For Dehydrated Foods

(*Continued from page 58*)

in the dried form and when reconstituted. Color—Shall be opaque white. Carmelization test—Dried egg whites shall not appreciably darken when heated for one hour at 100 deg. C. in a double boiler or steam bath. Texture—Spray-dried albumen shall be smooth and free from lumps that do not readily fall apart under light pressure. Reconstitution—Shall be readily and quickly reconstituted with water, and shall produce a smooth mixture. Dried albumen shall also retain the whipping qualities of the fresh product in accordance with the following: onds in second speed, and 90 seconds in third speed, shall produce a foam which, when leveled, fills the 10-quart bowl of the Hobart whipper, or other equivalent whipper, to a uniform depth of not less than 5-½ in.

Type III, Class A. Spray-dried egg yolk—The product shall be spray dried, and, in addition, shall comply with the following requirements within 72 hours from the time that the finished product is removed from the drier.

Moisture—Shall not exceed 5 percent. Fat—Shall be not less than 57 percent as measured by the acid hydrolysis method. Standard bacterial plate count—(a) Shall not exceed 150,000 per gram. The plating medium shall be standard nutrient agar and the plates shall be incubated at 37 deg. C. for 48 hours. (b) Coliform organisms shall not exceed 100 per gram when examined under methods prescribed in the "Standard Methods for Examination of Dairy Products," American Public Health Association, 1941. (c) Yeast and mold count shall not exceed 100 cells per gram, respectively, when incubated on potato dextrose agar at 32 deg. C. for 48 hours. The agar shall be adjusted with tartaric acid at the time of pouring to pH 3.5, plus or minus 0.1.

Odor and flavor—Shall have a sweet wholesome egg-yolk odor and flavor, both in the dried form and when reconstituted. readily and quickly reconstituted with cold water, and shall produce a smooth mixture simulating liquid yolk consistency.

Inspection and Tests

Inspection shall be made at point of origin unless otherwise specified in the invitation for bids. Unless otherwise specified, chemical analyses, if required, shall be made in accordance with methods of the Association of Official Agricultural Chemists, in effect on date of invitation for bids. Unless otherwise specified, bacteriological analyses, if required, shall be made in accordance with the methods prescribed in the "Standard Methods for the Examination of Dairy Products," American Public Health Association, in effect on date of invitation for bids.

Packaging

Packaging—Unless otherwise specified, 2-½, 3, 3-½ or 4 lb. (the maximum quantity the can will accommodate) of Types I, II and III shall be packaged in a No. 10 or a 5-qt. hermetically sealed sanitary metal can. The cans shall be of the following construction: The body shall be of electrolytic tinplate and the ends of the same or of chemically treated plate, either plate being not less than 107 lb. per base box. The body seam shall be soldered and the top and bottom shall be compounded and double seamed on the can. The can shall be protected on its outside surfaces with a suitable corrosion-resistant lacquer. If the ends are made of chemically treated plate, then the inside of the ends shall be similarly lacquered.

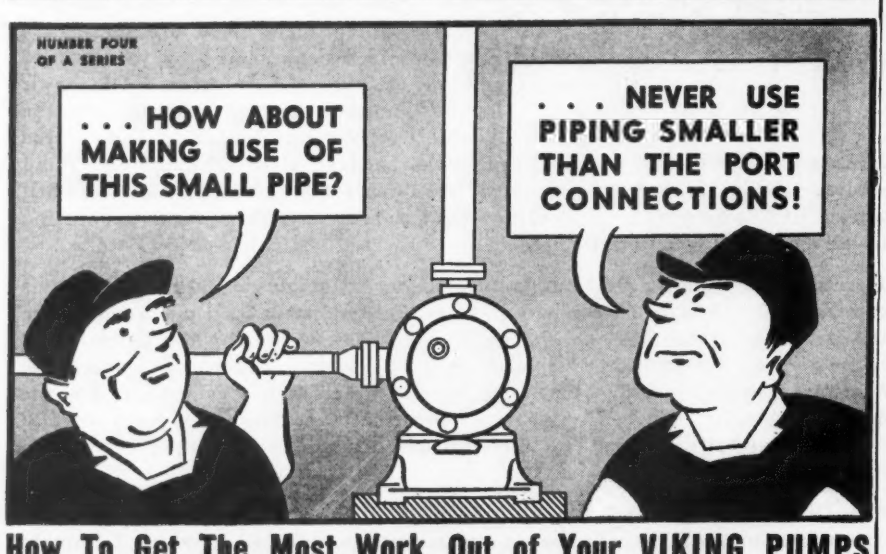
Labeling—Unless otherwise specified, one end of the can shall be lithographed with the following information: Manufacturer's name and address; name and type of product; net weight in pounds; "Keep cool and dry;" "To prepare for use, add to luke warm water and mix;" "Use within 30 minutes." "Contents of this can plus W quarts of water will furnish the equivalent of X whole eggs" (or Y whites or Z yolks as the case may be). The quantities W and X (or Y or Z) shall be determined and specified by the packer. The month and year of packing.

Packing—Unless otherwise specified, the product shall be packed six cans to the case in fiber boxes type VSS complying with Quartermaster Corps Tentative Specification, OQMG No. 93. B flute corrugated test liners shall be placed between cans and on the top and bottom and ends and sides of the case. The cases shall be tightly strapped in compliance with Quartermaster Corps Tentative Specification, OQMG No. 12-A.

Dehydrated Cheese

and 201, 1931.

3. W. V. Cruess, "Commercial Fruit and



How To Get The Most Work Out of Your VIKING PUMPS

Use of pipe of the proper size for suction and discharge lines is essential to the efficient operation of Viking Rotary Pumps. Do not use pipes smaller than the connections on the pump. The next larger size is preferable, especially on heavier oils or on suction lines exceeding 100 feet. If suction lines required are longer than 200 feet, write for special recommendations.

Now that pumps are hard to get it pays to take good care of the ones you have. The Viking Service Manual tells you how. It gives you clear, practical help in mount-

be printed on the side of the carton; otherwise, it shall be printed on the outside of high vacuum to one-third of its original volume. The least stable constituents

Quartermaster Corps Tentative Specification OQMG No. 12-A, "Packing for Overseas Shipments."

Material and Workmanship

The natural cheese used in the manufacture of this product shall meet the requirements of Type I, Federal Specification C-C-271. In addition to complying with Federal Specification C-C-271, the cheese used shall have a weighted average age of four months.

This product shall be prepared under strictly sanitary conditions and in accordance with standard commercial practice.

Detail Requirements

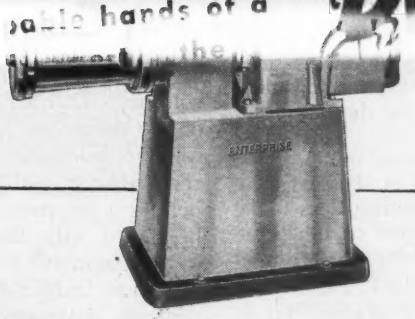
In the preparation of this product not more than 3 percent of a suitable emulsifier and not more than 1¼ percent of salt may be added. Artificial color may be added to produce the desired color in the finished product. The finished product shall have a moisture content of not more than 4 percent and a minimum fat content of 48½ percent. The cheese powder shall be pressed into bars of approximately 5 oz. net weight. Each bar shall be scored in such a way that it can be easily broken into four equal parts.

Inspection and Tests

Unless otherwise specified, inspection for compliance with this specification shall be made at the point of origin, during the process of manufacture and packing. Product inspected at origin will be subjected to inspection at destination for condition only. Otherwise, inspection will be made at the point of delivery. Chemical analyses, if required by the purchaser in the examination or testing of samples and deliveries under this specification, shall be made in accordance with methods of the Association of Official Agricultural Chemists, in effect on date of invitation for bids.

Packaging

Packaging—Each brick of the product shall be dipped into molten fully refined paraffin having a melting point of not less than 132 deg. F. (ASTM, D87–37) so as to cover it with a continuous film about 0.025 in. thick. The wax-coated brick shall then be placed in a folding board carton made from board containing no waste fibrous raw material. The board shall have kraft or khaki-colored, or drab gray, outer surfaces. The board shall be free from odor and shall be at least 0.020 in. thick, unless made from solid kraft or sulphite, when it shall be at least 0.0.15 in. thick, and shall bear a glassine liner having a basis weight of at least 20 lb. (24"x36"—500). This glassine liner for the interior of the carton shall have a grease resistance of over 600 seconds (TAPPI, T454M-42). The



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be printed on the side of the carton; otherwise, it shall be printed on the outside of the wrapper.

Packing—Unless otherwise specified, the packages shall be packed in standard commercial containers, so constructed as to insure acceptance by common or other carriers, for safe transportation, at the lowest rate, to the point of delivery.

Marking—Unless otherwise specified, all cases shall be stenciled or printed as follows: Number of units, name of product, date (month and year) of packing, contract number, name and address of manufacturer.

Concentrating Citrus Juices by Vacuum

(*Continued from page 64*)

sible from condensers in which they are mixed with condensing water. The esters might be recovered in a surface condenser attached to a small single-pass evaporator inserted between the juice pasteurizer and the vacuum pan, using the heat of the liquid to effect the evaporation.

Until some development permits the high vacuum to one-third of its original volume. The least stable constituents of the oil are thus distilled off, and are sold in the trade as "terpenes." The concentrated cold-pressed oil remaining behind is improved in stability and may be mixed with the citrus concentrates in the form of an alcholic solution or emulsion immediately before the concentrate is removed from the vacuum pan.

Part II of this article will be published in FOOD INDUSTRIES *for June, 1943.*

References

1. J. L. Heid and W. C. Scott, *Fruit Products Journal*, vol. 16, 136, 1937.
2. ———— , *Fruit Products Journal*, vol. 17, 100, 1937.
3. J. W. Stevens, and W. E. Baier, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 2, 447, 1939.
4. J. W. Stevens, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 10, 269, 1938.
5. R. R. Musulin and C. G. King, *Journal of Biological Chemistry*, vol. 116, 409, 1936.
6. O. A. Bessey, *Journal of Biological Chemistry*, vol. 126, 771, 1938.
7. Morrell, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 13, 793, 1941.
8. T. A. Bruce, U. S. Patent No. 2, 147, 238.

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Controlled Atmosphere Storage of Fruits

(*Continued from page 72*)

the low oxygen and high carbon dioxide are not suited to human respiration. The room must be loaded, left until it is desired to market the entire contents, and then ventilated before being unloaded.

With apples, particularly certain varieties, such as McIntosh and Jonathan, controlled atmosphere storage has had marked beneficial effects upon keeping quality. With pears, equally fine results have been achieved. However, the results with stone fruits, with the exception possibly of cherries, do not, from present information, warrant the additional expense of controlled atmosphere storage. Whether or not it will pay to ship cherries and berries to distant markets in atmospheres containing carbon dioxide supplied by the addition of dry ice to the refrigerator cars will depend upon the availability of suitable cars, reduction in wastage from rots and the appearance of the fruits on arrival. Work with citrus fruits has not progressed far enough to evaluate results.

References

1. F. W. Allen and L. R. McKinnon, Storage of Yellow Newtown Apples in Chambers Supplied with Artificial Atmospheres, *Proceedings of American Society of Horticultural Science*, vol. 32, 146-152, 1934.
2. F. W. Allen and R. M. Smock, Carbon Dioxide Storage of Apples, Pears, Plums, and Peaches, *Proceedings of American Society of Horticultural Science*, vol. 35, 193-199, 1937.
3. F. W. Allen, Carbon Dioxide Investigations: Influence of Carbon Dioxide Atmospheres upon Cherries, Plums, Peaches, and Pears under Simulated Transit Conditions, *Proceedings of American Society of Horticultural Science*, vol. 37, 467–472, 1939.

7. F. Gerhardt, A. L. Ryall, E. Smith and E. D. Millison, The Use of Solid CO_2 as a Refrig-

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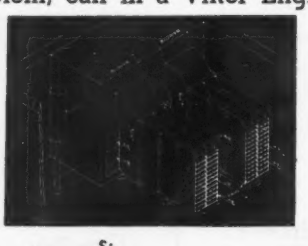

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ceedings of American Society of Horticultural Science, vol. 37, 467–472, 1939.

7. F. Gerhardt, A. L. Ryall, E. Smith and E. D. Millison, The Use of Solid CO_2 as a Refrigerant and as a Source of Gas to Supplement Standard Refrigeration in the Transportation of Sweet Cherries, H. T. & S. Office, Report 51, United States Department of Agriculture, 1940.
8. F. Gerhardt, E. Smith and H. English, Effect of Carbon Dioxide on Apricots and Peaches under Simulated Transit Conditions, *Proceedings of American Society of Horticultural Science*, vol. 38, 243-248, 1941.
9. F. E. Huelin, J. B. Tindale and S. A. Trout, The Cool Storage of Peaches: In Air and Artificial Atmospheres, *Journal of the Department of Agriculture*, Victoria, Australia, vol. 35, No. 12, 1937.
10. F. Kidd, C. West and M. N. Kido, Gas Storage of Fruit, Department of Scientific and Industrial Research, Food Investigation, Special Report 30, 1927.
11. F. Kidd and C. West, Gas Storage of Fruit. III. Lane's Prince Albert Apples, *Journal of Pomology and Horticultural Science*, vol. 11, 1933.
12. W. R. Phillips, The Application of Controlled Atmospheres in the Storage of Fruits, *Scientific Agriculture*, vol. 19, 66-68, 1938.
13. W. R. Phillips, Gas Storage, Dominion of Canada Department of Agriculture, Publication 670, Circular 149, December, 1939.
14. H. H. Plagge, Controlled Atmosphere Storage for Jonathan Apples, *Refrigerating Engineering*, vol. 43, 215-220, 1942.
15. A. L. Ryall, Certain Physiological Effects of CO_2 Treatment of Plums, *Proceedings of American Society of Horticultural Science*, vol. 32, 164-169, 1934.
16. A. L. Ryall, CO_2 Aids in Keeping Cherries, *Better Fruit*, vol. 20, No. 3, September, 1935.
17. R. M. Samisch, Observations on the Effects of Gas Storage upon Valencia Oranges, *Proceedings of American Society of Horticultural Science*, vol. 34, 103-106, 1936.
18. E. F. Smith, F. Gerhardt and W. H. English, Report on a Transportation Test with Sweet Cherries in Refrigerator Cars: Influence of the Height of the Load. Mechanical Circulation of Air, and the Use of Carbon Dioxide as a Supplement to Standard Refrigeration. United States Department of Agriculture, H. T. & S., Office Report, No. 92, 1942.
19. R. M. Smock and A. Van Doren, Studies with Modified Atmosphere Storage of Apples, *Refrigerating Engineering*, vol. 38, No. 3, September, 1939.
20. R. M. Smock and A. Van Doren, Controlled-Atmosphere Storage of Apples, Agricultural Experiment Station, New York, Bulletin 316, 1941.
21. A. L. Stahl and J. C. Cain, Cold Storage Studies of Florida Citrus Fruits, Florida Agricultural Experiment Station, Bulletin 316, 1937.
22. J. H. L. Truscott, The Handling and Storage of Bartlett Pears Grown in the Niagara Peninsula, Mimeos from Ontario Agricultural College, 1940.
23. A. Van Doren, M. B. Hoffman and R. M. Smock, Carbon Dioxide Treatment of Strawberries and Cherries in Transit and Storage, *Proceedings of American Society of Horticultural Science*, vol. 38, 231-238, 1941.
24. J. D. Winter, R. H. Landon, A. C. Vogele and W. H. Alderman. The Carbon Dioxide Treatment of Raspberries and Strawberries, *Proceedings of American Society of Horticultural Science*, vol. 35, 88-192, 1937.
25. J. D. Winter, R. H. Landon and W. H.

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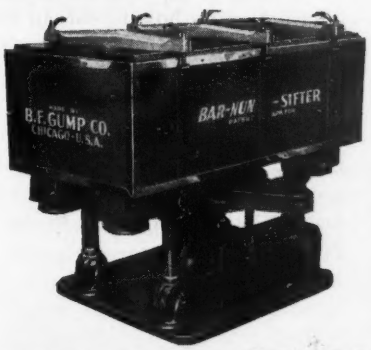

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Formula for Frozen Baked Pork and Beans

New Jersey—"We are contemplating adding 'Baked Beans' or 'Pork and Beans' to our line of frozen products. Receipt of any recipes, formulas, or other data on these products that you may have available shall be greatly appreciated."

In reply to this and similar inquiries, we are publishing in this issue, on page 131, the complete formula and manufacturing directions developed as a result of recent research work at the Western Regional Laboratory, U. S. Department of Agriculture, Albany, Calif.

Citric Acid Substitute

Illinois—"We notice that some firms are producing a substitute for citric acid, and we would like very much to secure a formula, also names of the suppliers of the ingredients necessary to produce this item."

This question probably refers to the use of levulinic acid, which has been marketed in a very limited way as a substitute for citric. The firm which supplied this acid has limited equipment for its production and has been unable to meet the heavy demand for this product. We do not know of another producer of levulinic acid.

Pickle Containers

Massachusetts—"I use second-hand wooden 5-gal. kegs for pickles with vinegar. Do you know of any other package, made from waxed cardboard or plastic, that could be used? I use quite a number of them, but they must be reasonable in price as pickles do not bring big prices."

The only material except wood or glass which has been used at all for pickles is Pliofilm, and use of this material is restricted entirely to government requirements.

Plastics, even if available, would be too expensive. One difficulty with paper or cardboard would be in providing a satisfactory seal.

You should be able to get a supply of wooden kegs, such as you have been using. Under the WPB Preference Rating Order P-140 which covers such

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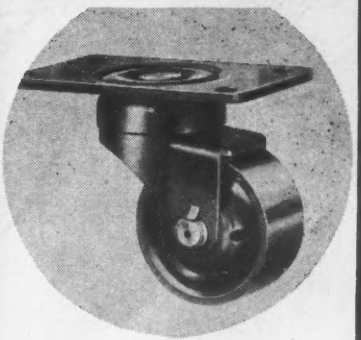

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(*FOOD MATERIALS "Guide to Enrichment", November, 1942*)

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Right now there are two kinds of currency being used in buying many food products—money and points. And as your own wife can tell you, *points are by far the most important!*

As a result, America's housewives are shrewdly insisting on getting maximum nutritional value for each precious point they have.

No more haphazard buying on the home front! And none when Uncle Sam buys for the boys on the battle front. Today your products must justify their right to a place in the rationed family market basket . . . must justify their right to precious cargo space. And when the decisions are made, the word "Enriched" has a truly amazing effect—for everyone knows that "Enriched" means *improved!*

If your products don't measure up in vitamins—if they have lost vitamins in processing—somebody else's "Enriched" products may crowd yours out.

So give serious thought to enriching. Find out today which of your products, in the opinion of nutritional authorities, should be enriched. Then with vitamin enriching costs down to a mere fraction of what they used to be, go ahead and give your products the soundest possible nutritional foundation.

Do this not only to safeguard your present sales, but also to win new customers for your product.

Let us give you the latest technical information on how to enrich, the new low costs and the many benefits. We pioneered in vitamins and today are furnishing a goodly percentage of the nation's vitamin B_1, B_2 and C requirements. Write for these latest sales enriching facts today. Hoffmann-La Roche, Inc., Vitamin Division, Roche Park, Nutley, New Jersey.

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NEW DISCOVERIES AND INVENTIONS

ENGINEERING

Peanut Grinding

By a recently patented process peanuts are comminuted to a uniformly fine butter with a minimum amount of cell rupture, being held by a water-cooled sleeve against the outer surface of a hollow cylinder covered with a fine-mesh wire cloth, revolving at a surface speed of 4 to 8 ft. per second. The fine particles pass through the screen and the butter is removed continuously from one end of the hollow cylinder.

This butter is claimed to be smoother in texture, easier to digest and less subject to rancidity, because the cells are not ruptured. It requires no stabilizer and retains a pure nutty flavor longer than any other commercial unstabilized peanut butter.

Digest from U. S. Patent 2,307,398, issued January 5, 1943, to G. A. Fisher, and assigned to William S. Scull Co., Camden, N. J.

Spray Drying

Recent patents cover engineering improvements increasing the capacity and thermal efficiency of spray-drying processes.

Materials containing proteins susceptible to coagulation by heat are dried in a multistage system wherein a spray drier is operated so as to reduce the substance to a solid but not to dry it completely, and a succeeding stage consists of a cyclone drier operated at a lower temperature, with addition of dry heated air, so that the solid particles from the first stage are subjected to the drying gas at a higher velocity and at a much lower relative humidity. The system further comprises the usual classifiers and separators. The partially dried solid particles from the first stage are conveyed directly to the second stage, without intervening rest. The feed for the spray drier may be vacuum concentrated. Advantages claimed are a greatly increased capacity for a spray drier of a given volume and a product which is more soluble and not discolored, loss of solubility and discoloration [illegible] heat [illegible] driers, an automatic method has been of 170 deg. F. Additional dry air for the second drier has a temperature of 220 deg. F., while the outlet temperature from the classifier is 150 deg. F. and the air is not saturated. The product may have 0.5 to 3 percent moisture as desired.

A second patent to the same patentee introduces into the drying system a heat exchanger which maintains a partial vacuum on the material being evaporated and preheats incoming liquid, the preheated liquid then being used to wash out any powder carried over in the exhaust from the spray drier before it is subjected to vacuum concentration. The vacuum concentrate is then fed to the spray drier.

Digest of U. S. Patents 2,310,650, issued Feb. 9, 1943, and 2,312,474, issued March 2, 1943, both to David D. Peebles, and assigned to Golden State Co., Ltd., San Francisco, Calif.

MEATS

Effect of pH of Pickle On Color of Cured Pork

Color development in cured pork is influenced sharply by the pH of the product. With pH below 5 it is impossible to obtain proper color fixation; the meat becomes less tender with decreasing pH, moisture loss or shrink increases and the flavor is undesirable or sour. A pH in the range of 5.2 to 6 seems optimum for normal color fixation and for tender and palatable meat. The range from pH 6 to 7 gives normal color but the meat becomes undesirably soft in some cases. The neutral range is further undesirable because of the likelihood of the development of proteolytic bacteria. Above pH 7.5 or 8 the meat is almost gelatinous after 2 or 3 days curing.

The pH affects color fixation by influencing the rate of the nitrite-myohemoglobin reaction. It is nitric oxide myohemoglobin which gives a good red color.

In a laboratory method of curing to eliminate unknown factors, using small cubes of pork, microorganisms are controlled by sterilization under a germi- [illegible] lamp [illegible] and gold [illegible] effect ing action of the pork. Buffered solutions were used to obtain a pH range from 4.4 to 9, the buffer salts being without any specific influence on the color developed.

Digest from "Relation of Hydrogen-ion Concentration to Color Developed in Cured Pork," by P. C. Duisberg and R. C. Miller, *Food Research*, vol. 8, 78-87, January, 1943.

STABILIZERS

Gum Guaiac Stabilizer

In the use of gum guaiac as a stabilizer for fats and oils as covered by U. S. Patent 1,903,126, considerable difficulty has been encountered in securing the necessary dispersion of the stabilizer in the fatty product. A recent patent discloses that addition of the stabilizer may be facilitated by use of a volatile fatty acid as a carrier, since gum guaiac is soluble in the lower fatty acids such as acetic, propionic, butyric, caproic and caprylic. Acetic is preferred for this purpose. The fatty acid can be removed by steam distillation at temperatures below that at which decomposition of the fat occurs, and will be so removed if steam deodorization is done after incorporation of the dissolved stabilizer.

Digest of U. S. Patent 2,308,912, issued Jan. 19, 1943, to J. L. Doegey, and assigned to Industrial Patents Corp., Chicago, Ill.

Aging Temperature For Ice Cream Mixes

This study was undertaken to find an explanation for the increased efficiency of gelatine in ice cream mixes. It had been observed that when mixes containing gelatine were initially aged at 68 deg. F. for 4 to 6 hours the product was smoother than when aged at 38 deg. F. for the entire holding time. Or the gelatine could be reduced approximately one-fourth without impairing the quality of the product. If there was no recontamination after pasteurization, the higher aging temperature did not increase the bacterial count.

Physical determinations, such as [illegible] rotation [illegible] ct and [illegible] effect

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modification present. Tests on gelatine solutions indicate that the optimum temperature is approximately 68 deg. F.

Digest from "An Explanation of the Increased Efficiency of Gelatin in Ice Cream Mix When Initially Aged at 68° F.," by W. S. Mueller, *Journal of Dairy Science*, vol. 26, 189-203, February, 1943.

CANNING

Staphylococcus In Processed Foods

CANS of ten products selected to cover a range of acidity were inoculated with *Staphylococcus aureus*, then the cans were resealed and incubated for periods up to 60 days at 71.6 and at 98.6 deg. F.

There appears to be a direct correlation between pH and growth of staphylococci. No growth occurred in the acid foods, represented by tomato juice and peaches. There was some growth with the semi-acid products, asparagus, spinach and string beans. Growth occurred in the low-acid groups, both beans and corn and the shellfish, shrimp and salmon.

Growth was greater in those cans incubated at 71.6 deg. F. than in the ones held at 98.6 deg. F. In the case of peas and corn, gas was evolved, consisting principally of carbon dioxide and nitrogen, with some hydrogen and oxygen. This was unexpected, since staphylococci ferment the common laboratory sugars with production of acid only. The inoculation technic was such that there was no secondary contamination.

Digest from "Growth of a Food-Poisoning Strain of Staphylococcus Experimentally Inoculated into Canned Foods," by M. Segalove, E. Davison and G. M. Dack, *Food Research*, vol. 8, 54-57, January, 1943.

VITAMINS

Azotobacter Production

AZOTOBACTER cells grown in a nitrogen-free medium comprising sucrose and mineral salts have a vitamin content equal to or greater than that of brewer's yeast. Biotin, thiamin and pantothenic acid are higher when the cells are grown in a molasses medium, but [illegible] acid and riboflavin are somewhat lower.

[illegible] supply was obtained from the air energy for its fixation must be furnished by the carbon source in the medium.

Yeast grown under optimum conditions in grain wort with rapid aeration, will give yields as high as 30 percent dry yeast from the sugar used, but the efficiency of the azotobacter process may be increased when optimum conditions for it have been established through further study.

Digest from "Large-Scale Production of Azotobacter," by S. B. Lee and R. H. Burris, *Industrial and Engineering Chemistry*, vol. 35, 354-57, March, 1943.

BEVERAGES

Acidulated Juices

SAUERKRAUT juice with a pH of 2.18, containing one part acetic acid to about four of lactic acid, was found satisfactory in acidifying blends of less acid vegetable juices. The flavor was in all cases better than with hydrochloric, lactic, acetic or phosphoric acids. The same type of curves are obtained for the addition of an acid to each of the vegetable juices to bring the blend to a desired pH, the difference being only in the amount required in each case.

The vegetables should be macerated and extracted, then the juice blended and processed immediately. A satisfactory process is to blend to pH 4, deaerate at 14 to 16 mm., flash pasteurize at 180 deg. F. and fill into cans or heated bottles.

Beet, onion and white turnip give a pleasing flavor, but can be used only in small amounts in blends. Rutabaga is strong flavored, red cabbage flat and tasteless. Celery and carrot are good. Any of these juices, except rutabaga and cabbage, blend well with tomato juice, preferably using about two-thirds tomato juice in the final blend.

Digest from "Acidified Vegetable Juice Blends," by H. G. Beattie and C. S. Pederson, *Food Research*, vol. 8, 45-53, January, 1943.

CEREALS

Grain Storage

GRAIN in storage will first undergo deterioration, with growth of fungi and development of heat, in small patch[illegible] in the wetter portion of the bulk. Heating may spread throughout the stor[illegible]

ored, loss of solubility and discoloration

driers, an automatic method has been developed which will separate the drier fraction that will have a longer normal storage life from the wetter portion, which may then be dried separately.

Grain passes in a stream of constant thickness between two metal plates acting as a condenser. An alternating potential of constant frequency is applied to one plate and the other plate is grounded. The current controls the separating mechanism, passing the grain to one or another of two chutes. The precision obtained is adequate for the purpose.

Digest from "Automatic Separation of Wet from Dry Grain for Storage," by T. A. Oxley and F. Y. Henderson, *Nature*, vol. 151, 223, Feb. 20, 1943.

FUMIGATION

Residual Bromide In Dairy Products

Methyl bromide fumigation is suitable for dairy products. The bromide is toxic to all forms of insect life, including cheese mite (*Tyroglyphus siro*) and cheese skipper (*Piophila casei*), weevils and roaches, and their eggs. It is effective at low temperature whereas many other fumigants become ineffective when the temperature drops. Because of its penetrating power it can be used satisfactorily in vaults, coolers, curing rooms, warehouses or factories tight enough to confine gas. No off-tastes or odors were found in dairy products inspected.

Cheese, dried skim milk, butter and oleomargarine were fumigated under warehouse conditions. It was found that the bromide does not penetrate much beyond the outer quarter-inch in cheese and butter, and that all of the absorbed methyl bromide has been lost, either by volatilization or by conversion into inorganic bromide, within two or three days after removal from the fumigation chamber. The bromide does penetrate any crack or opening communicating to the air, but the residual bromide will be about the same in the interior in this case as on the outside.

There is an ample margin of safety

Avoid food ... spoilage loss ... meet your sanitary requirements easier

Use dependable OAKITE MATERIALS TO CLEAN all your processing equipment!

With less time available for clean-up work and critical shortages in manpower ... EXTRA sanitary precautions must be taken today to prevent product spoilage or loss due to incomplete removal of contaminating organisms from equipment.

Fast-acting Oakite cleaning gives you this EXTRA protection that helps safeguard product QUALITY because it effectively, THOROUGHLY removes all contaminating deposits from equipment ... does it QUICKLY ... enables your clean-up crew to do this essential work EASIER.

Why Valuable Equipment *LASTS LONGER*

Oakite materials for cleaning processing, mixing and handling equipment are so designed that no harm to surfaces occurs. That is why your existing equipment will last longer.

ASK US ABOUT CLEANING

Blanchers ... Scalders	Work Tables	Canning Sinks
Cookers	Stuffers ... Cutters	Trays, Pans, Moulds
Grinders ... Mixers	Fittings, Pumps, Piping	Floors, Walls
Retort Baskets	Cooling Slabs	Vats, Tanks, Tubs
Conveyors, Flumes, Belts	Steam Jacketed Kettles	Pasteurizers
Exhaust Boxes	Juice Extractors	Fillers ... Labellers

OAKITE PRODUCTS, INC., 26C Thames Street, NEW YORK, N. Y.

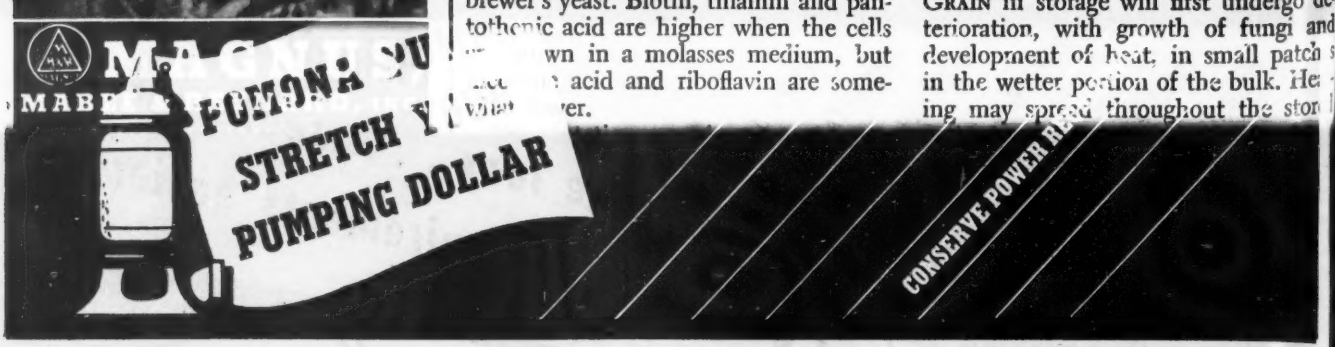
FORMULA NO. 403

kettle (preferably jacketed) and packaging equipment.

to the hot tomato-water-spice mixture and cook until the starch becomes clear

brewer's yeast. Biotin, thiamin and pantothenic acid are higher when the cells grown in a molasses medium, but ... acid and riboflavin are somewhat lower.

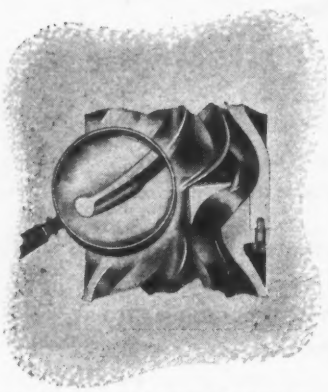
GRAIN in storage will first undergo deterioration, with growth of fungi and development of heat, in small patch... in the wetter portion of the bulk. Heating may spread throughout the stor...



NEVER BEFORE HAS POWER CONSERVATION BEEN SO IMPORTANT

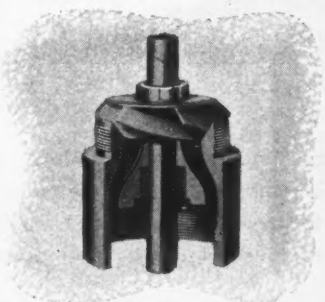
Never before have Pomona advantages been so vital!

Pomona Pumps are singularly able to cut power requirements to a minimum because they embody basic engineering advantages found in no other pumps . . .



BULBOUS VANED BOWLS! This outstanding Pomona Pump development has lifted the already high Pomona efficiencies to a new peak . . . *in some cases above 90%* . . . reducing power requirements to a record low. The bulbous end shape smooths out fluid flow, minimizing turbulence, eddy currents and resultant skin friction. Result — more power goes into actual water pumping!

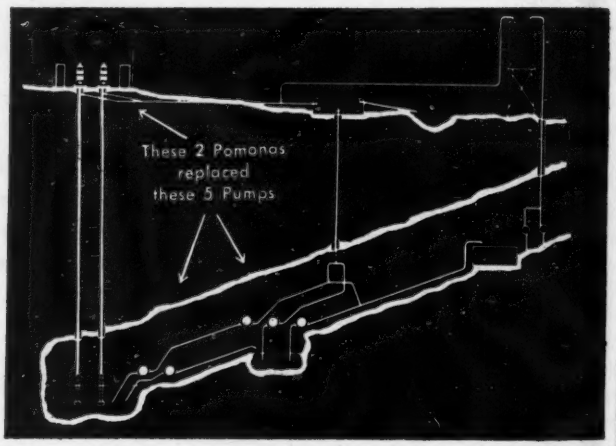
Bulbous vaned bowls are a recent Pomona advancement, and older Pomona Pumps can be re-bowled with this power-conserving feature. However, to save metals, get as much service as possible from your present bowl assemblies be-



ADJUSTMENT FOR CAPACITY! Here's another vital power-conserving feature that no other pump provides—ability to adjust the capacity to your exact needs *without wasteful throttling*. Unlike conventional pump impellers, Pomona's semi-open impellers can be raised or lowered on their seats to give the exact flow desired, *with proportionate savings in power*. And this adjustment can be quickly made *at the surface* with minimum effort. Raising the impeller gives more clearance between blades and seat—pumping less water and, at the same time, reducing the operating power required.

RESULT—power consumption is proportionate to amount of water pumped.

Contrast this with the valve-throttling necessary in other type pumps to adjust pump flow. Throttling increases the pressure the pump must work



ONE POMONA CAN REPLACE SEVERAL PUMPS— Often a single Pomona Pump will do the job now requiring *several* other-type pumps . . . will do it *better*, with considerably *less* power. Typical is the Pomona installation diagrammed above where two Pomonas replaced FIVE horizontal pumps on a dewatering job. The Pomonas not only eliminated excessive piping and power cables, but did the job on 400 h.p., whereas the 5 pump arrangement had required 675 h.p.—*67% more!* Compare the power *costs*—$19,936 per year with the five-pump set-up . . . $10,750 per year—about HALF—with the Pomonas!

Call in your nearest Pomona representative and have him check over your pumping installation. Perhaps he can help you take fuller advantage of the *many* — and varied — savings incorporated in Pomona Pumps. You'll save power, save money, save

POMONA
Water-Lubricated
PUMPS

JOSHUA HENDY IRON WORKS
POMONA PUMP CO. DIVISION
120 BROADWAY, NEW YORK CITY

There is an ample margin of safety

FORMULA NO. 403

Norwegian Sweet Bologna

Beef trimmings	30 lb.
Boneless chucks	30 lb.
Pork trimmings	40 lb.
Dry milk solids*	4 lb. 8 oz.
Dried seedless raisins	3 lb.
Salt	3 lb. 4 oz.
Invert sugar	3 oz.
White pepper	5 oz.
Onion powder	1 oz.

*Not over 1½ percent fat.

Directions

Grind the beef and pork separately through a ¼-in. plate. Wash the raisins in cold water until clean. Put the beef in a silent cutter, and add the salt and invert sugar, shaved iced and dry milk solids. Chop for five minutes, then add the pork and spices. When the mixture is fine enough, add the raisins and chop for 2 or 3 revolutions. Add enough ice during the chopping period to make a mixture of the right consistency; the mix should be chopped to about the same fineness as regular bologna.

Stuff the mixture in 1-⅞x20-in. cellulose casings or wide beef middles. Hang in the smokehouse and smoke for 2 to 2½ hours at 120 to 160 deg. F. Cook at 160 deg. F. for 45 to 60 minutes, depending on the diameter of the casing.

Place under cold shower or immerse in cold water for about 10 minutes. Enough heat should be left in the sausage so it will dry itself.

Strained honey may also be used in this bologna instead of raisins. When honey is used, heat 1½ lb. of honey so that it will run freely when poured. Pour it evenly over the meat just before the chopping process is completed.

Formula from American Dry Milk Institute.

FORMULA NO. 404

Quick Frozen Baked Pork and Beans

Satisfactory frozen pork and beans of the tomato-sauce type have been prepared in the Western Regional Research Laboratory using the following formula, which is a modification of the

kettle (preferably jacketed) and packaging equipment.

Ingredients

Beans	415 lb.
Tomato puree (1.035 sp. gr. basis)	270 lb.
Sugar	47 lb.
Salt	17¼ lb.
Onions, fresh, ground	6 lb.
Allspice, whole	6 oz.
Cinnamon, whole	7 oz.
Clove, whole	6 oz.
Mace, whole	4 oz.
Fat from cooked pork	
Cornstarch	11¾ lb.
Citrus pectin, slow set (100 grade basis)	2 lb.
Water to make total of 900 lb. (100 gal.)*	
Pork, trimmed	56 lb.

*Add 48-gal. (400 lb.) before cooking, then make up to volume after cooking.

Procedure

Blanch small white beans for 4 minutes at 170 deg. F., soak in soft, cold water about 16 hours, changing the water three times during the soaking period. Drain and cook in wire baskets 50 minutes at 15-lb. steam pressure. Longer cooking yields a darker brown bean but destroys the vitamin B_1.

Cut the pork into ½-oz. pieces and cook in a covered pan for 30 minutes at 15-lb. steam pressure. The original pork must be of excellent quality or it may become rancid during prolonged storage. In accelerated rancidity tests in which the frozen pork and beans were held at 40 deg. F., it was found that if the original pork were good, the pork stood up as long as the beans and sauce. The results of accelerated tests at 40 deg. F. probably are a good indication of the behavior at much lower temperatures for longer periods. The accelerated tests should not be interpreted as a recommendation for long storage at this higher temperature. Bacon gives markedly better flavor to the entire product than does fresh or salt pork.

For the sauce, tie the broken-up spices and ground onions in a cloth bag and cook for about an hour in order to extract the flavor. Then remove the bag of spices, add the sugar (saving about 15-lb. to mix with the cornstarch and pectin), salt and tomato puree. After the tomato is added, cook for as

5), Amend ... 1. Jun ... trim the ... and flavor a

to the hot tomato-water-spice mixture and cook until the starch becomes clear (about 5 minutes). Make up to 100-gal.

Fill cellophane or other suitable bags in waxed cartons with 48 percent cooked beans and 52 percent sauce by weight, plus one piece of cooked pork per package, all cooled to 145 deg. F. or lower before packaging. Heat-seal the cellophane bags or seal paper bags and containers in a suitable manner.

Freeze and store at zero deg. F. or lower temperature.

For serving, partially thaw the pork and beans in the package in order to prevent overcooking and mashing of the outside layer before the center portion is thawed during cooking. Heat to serving temperature in a casserole in the oven or in a double boiler on top of the stove.

Discussion

When all of the ingredients were cooked together as is done in the canning procedure, the beans mashed badly and were difficult to package, the tomato was overcooked, and it was impossible to place uniform quantities of sauce and beans in each package. In the canning procedure, the starch from broken beans probably thickens the sauce but it was necessary in the procedure for freezing to add a thickening agent. The pectin is added to prevent curdling of the sauce when it is thawed. The curdling disappears, however, when the pork and beans are heated and stirred.

Formula from Western Regional Research Laboratory, Bureau of Agriculture and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, Albany, Calif.

FORMULA NO. 405

Fluffy Delight Icing

Water	1 lb. 12 oz.
Gelatine	2 oz.
Powdered sugar	12 lb. 4 oz.
Emulsifying-type shortening	5 lb.
Salt	2 oz.
Glucose	4 oz.

Directions

Dissolve the gelatine, glucose and

...er. Add slowly

...ortening ... the bow

Whip

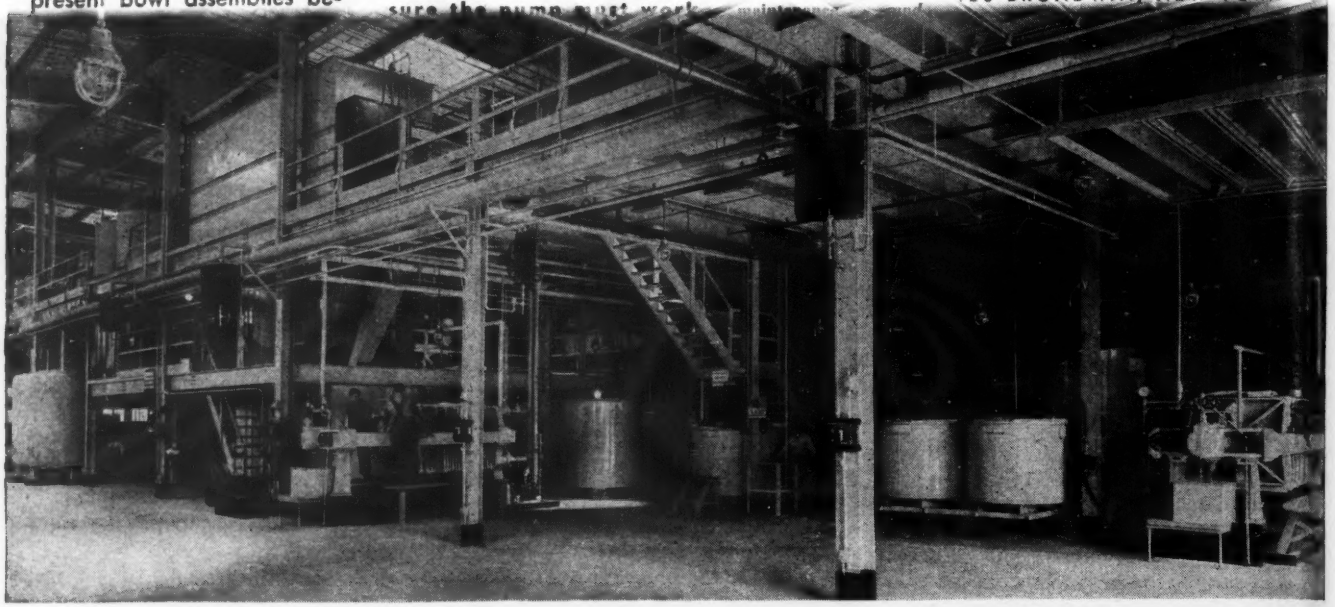
Keeps the Motor Clean!

conserving feature. However, to save metals, get as much service as possible from your present bowl assemblies be-

Contrast this with the valve-throttling necessary in other type pumps to adjust pump flow. Throttling increases the pressure the pump must work

savings incorporated in Pomona Pumps. You'll save power, save money, save

JOSHUA HENDY IRON WORK
POMONA PUMP CO. DIVISIO
120 BROADWAY, NEW YORK CIT



Vitamins for Victory

● In all wars since history began disease has been the cause of more casualties, both military and civilian, than the weapons of the enemy. During the last World War it began to be recognized that some of these diseases, such as scurvy, were caused by a definite deficiency of some essential ingredient in the diet while others probably spread because of lowered resistance of the population due to this and other dietary lacks. Because of their relationship to life, these essentials were termed vitamins. Since practically nothing was known about them at the time, little could be done toward correcting these deficiencies.

Since then science has made tremendous strides in the chemistry of vitamins. The structure of most of those isolated has been determined and methods for synthesizing many of them developed.

The nations of the world have not been slow to recognize the importance of the vitamins. In her rearmament program Germany included factories for their production along with those for manufacturing guns, explosives and other munitions of war. One important ingredient in the emergency ration of the German parachute troops has been tablets of synthetic Ascorbic Acid (vitamin C). Our own Government has also recognized the importance of this vitamin and has included a product containing synthetic Ascorbic Acid in the ration of our Armed Forces.

The United States and the British Empire have also included the maintenance of civilian health and morale in their war plans. Enriched flours and breads, to which a number of the vitamins together with certain minerals have been added, have received official sanction. This development has been hampered by an insufficient supply of one of the vitamin ingredients – Riboflavin (vitamin B_2).

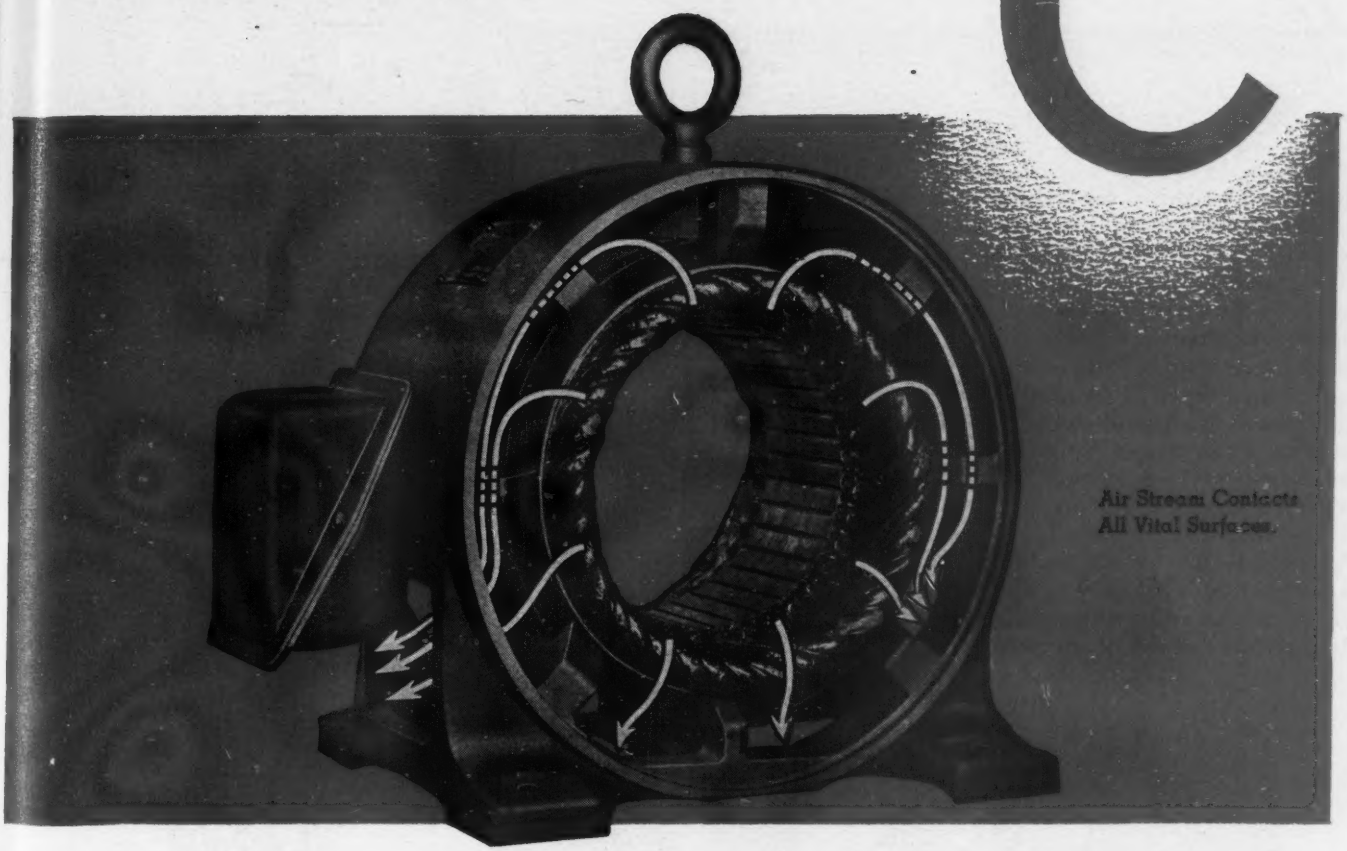
Chas. Pfizer & Co., Inc. has been one of the largest producers of Ascorbic Acid (vitamin C) for several years. There has been a continual increase in our production of this synthetic vitamin and plans are now in the process of consummation which will still further enlarge our productive facilities.

After a research program of several years, the production of Riboflavin (vitamin B_2) was started by our Company in 1940. At the present time we are bending every effort toward a great increase in the size of our productive facilities in order to assist in supplying the large quantities of this essential vitamin which are needed.

ABLISHED 1849

before it starts!

Keeps the Motor Clean!



The Century method of motor ventilation not only protects the insulation by sending a blast of cooling air through spacious air passages to all vital motor parts, but also keeps the air passages clean. This is due to Century's ventilation design in which the *cooling air is:*

1. **Drawn in around the bearing housing by two fans and the rotor bars.**
2. **Directed against the end of the rotor near the shaft.**
3. **Blown out across the copper conductor bar ends by the fans on the rotor.**
4. **Blown around the stator coil ends.**
5. **Deflected inside the frame across the outside of the stator laminations.**
6. **Forced out from the lower half of the frame at the side and bottom of the motor.**

Century air passages are large and smooth —not easily clogged—and suspended matter is carried through the passages and blown out by the force of the cooling air blast.

Proper cooling and ventilating is only one of the many design and engineering advantages of Century Motors. For complete information as to the proper Century Motor to meet your requirements, call in your nearest Century Application and Service Engineer today.

Form J Motors Are Now Available in 2 to 15 hp

CENTURY ELECTRIC COMPANY
1806 Pine Street, St. Louis, Missouri
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310

SPECIAL WAR PACKAGING AWARD!

ABLISHED 1849

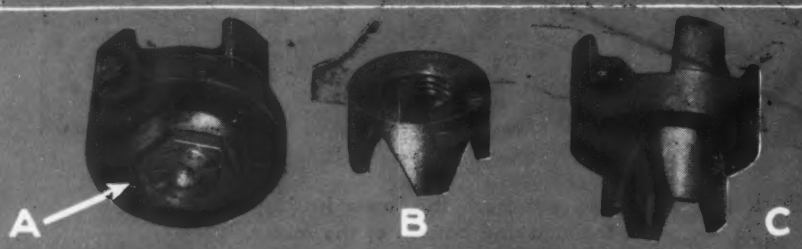
before it starts!

RAPID DESTRUCTION in Throttling Service can be prevented by use of Throttling Nut

This illustration shows the too common result of using a renewable composition disc valve for continuous throttling service. The bronze valve body was ruined by the effects of "wire drawing." The seat (1) was cut away; the outlet side of the diaphragm was penetrated (2).

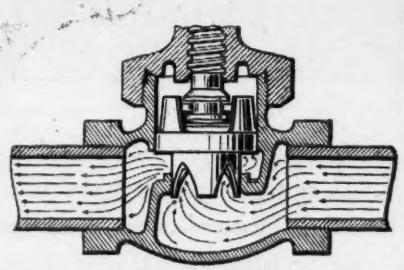
Many of your renewable disc seat valves in throttling service may meet the same fate unless immediate action is taken to save them . . . a simple change that will convert them to withstand throttling.

This change can be quickly and easily made in any Jenkins Renewable Composition Disc Valve by adding a Jenkins Throttling Nut (Fig. 344). This provides an effective substitute for hard-to-get plug type valves, which would be first choice for services that require the extreme close regulation of flow. It reduces to a minimum the damaging effects of wire drawing, and greatly increases the life of the valve.

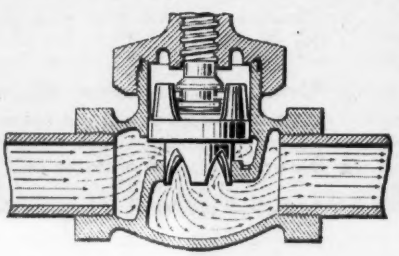


Throttling Nut Increases Valve Life 5 to 10 Times

Any Jenkins Renewable Composition Disc Valve can be converted for throttling service by removing standard disc nut (A) from standard disc holder, and replacing it with Jenkins Throttling Nut (Fig. 344) (B) to obtain assembly (C).



The legs of the Throttling Nut provide orifices which restrict the flow of liquids. Before any appreciable volume of fluid can pass through the throttling nut orifices, the seats are separated to such an extent that destruction from wire drawing of seat and disc is minimized. With this protection, seat and disc last much longer when valve is installed in the customary position . . . with inlet pressure beneath the seat, (above).



Where conditions make it necessary, or where the service permits it will

Since valve failure today can stall vital production, and since preventable wear is a needless waste of scarce valve metals, it is your duty to insist on effective conservation.

Make sure your valves are inspected regularly, systematically. Repair or replace worn parts before a valve destroys itself. Instruct maintenance workers thoroughly. Select valves for new installations carefully; install them properly. Consult Jenkins Engineers for assistance in improving your system of valve conservation.

Jenkins Bros., 80 White Street, New York, N. Y.; Bridgeport; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal; London.

JENKINS VALVES

outside of the stator laminations.

SPECIAL WAR PACKAGING AWARD!

For creating a new type of packaging material that is protecting food, drugs and ammunition *under every conceivable wartime condition,* Reynolds has received a Special Award in the 1942 All-America Package Competition.

The new material is a solid sheet of metal foil, laminated to cellophane and dense kraft. A protective layer of asphalt compound, plus a special heat sealing coating, combine with the foil to solve the "tin-can" problem. *Really armor-clad protection without the use of steel!*

This new development is performing amazing service on every fighting front . . . protecting sulfadiazine tablets, dehydrated foods, the famous Army "K" ration, concentrated cereals, bandages, film, ammunition, radio parts and emergency rations, matches and bibles for lifeboats, etc.

Manufacturers with war packaging problems are invited to write for full details on this new material and its application to specific needs.

Reynolds Award-Winning Material Meets These Army-Navy Requirements!

1. Positive Protection Against Moisture-Vapor Transmission.
2. Immersion-Proof. Keeps water out!
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4. Safe Protection for Long Storage Periods.
5. Substantial Saving in Tin, Steel and Other Strategic Materials.
6. Saving in Space, Especially Shipment and Storage of Empties.
7. Saving in Weight.
8. Serviceability Under Export Conditions.

REYNOLDS

Distillation Products, Inc.

One Organic Chemistry Department is

Where conditions make it necessary, or where the service permits [illegible]

Head Start!

Because of the educational advertising of dextrose, the mother and father of this sprightly young man make certain his mind and body are generously powered with foods enriched with this food-energy sugar.

The educational advertising of dextrose helps insure the future health and stamina of young Americans. It continues even though supplies are temporarily insufficient to meet both government priorities and civilian demands.

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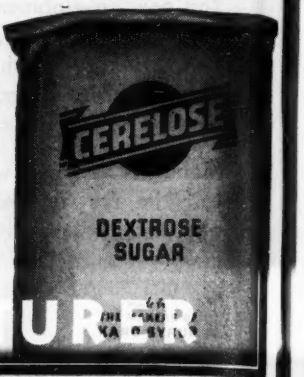
17 BATTERY PLACE, NEW YORK

The advertising of dextrose, as an educational force, doubly benefits America. Consumers learn how this pure white, crystalline food-energy sugar forestalls fatigue, fortifies energy. Asking for foods "Enriched with Dextrose", they increase the use of American corn, grown by American farmers, refined in American factories, distributed by American companies.



CERELOSE *is* DEXTROSE

TUNE IN

MANUFACTURER

Distillation Products, Inc.

REYNOLDS

THE production of vitamin A concentrate by molecular distillation is the outcome of Pure Research conducted for many years. The research work ranges from purely scientific aspects of vitamin chemistry through the development of industrial processes and new distillation machinery thus providing diversification and betterment of DPI products.

Our Biological Department is carrying out fundamental research on physiological and nutritive aspects of the vitamins, as well as performing bioassays on both commercial and experimental products.

CRYSTALLINE VITAMIN A ALCOHOL
First Produced in Pure Form in the Laboratories of Distillation Products, Inc.

Our Organic Chemistry Department is making pure vitamin compounds and is exploring into new vitamin fields. Three crystalline vitamin A compounds are being sold for research purposes. Crystals of the vitamin A alcohol are shown at left. As a result of this research and industrial development, DPI now owns fifty-eight United States Patents and has many others pending. The Director of Research and his associates have published a number of papers on the art of molecular distillation and its applications. Reprints as available will be supplied to interested persons upon request.

. . . have produced what we believe to be the finest available concentrate of vitamin A

It is this type of research pioneering which has resulted in the unique concentrate known as *Distilled Vitamin A Esters.**

This unique concentrate of vitamin A is from two to ten times more resistant to the action of heat and air than any other representative commercial vitamin A material we have tested.

Distilled Vitamin A in the natural Ester form is *bland*. It does not impart flavor or odor to the most delicate foods. It is *continuously available*, and in scientifically *uniform quality*. Potency specifications are met precisely to your order.

Get the facts about this superior vitamin A concentrate. Write for "The Story of Vitamin A Esters," new, completely revised edition.

DP INC.

*Protected by U.S. product patent No. 2,205,925 and more than 50 process patents.

DISTILLATION PRODUCTS, INC.

[illegible] RIDGE ROAD WEST, ROCHESTER, NEW YORK

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perfectly stable; requires no refrigeration; tocopherol content 3.5 to 4 milligrams per gram.

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Because carrot oil contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color.

Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

Also producers of ThiaBee, a stabilized wheat germ products rich in Vitamin B_1.

These vitamin products are of particular interest to all manufacturers of food products.

Inquiries are invited. Literature, prices and samples to firms requesting same on their letter heads.

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Remember, back of the signature of every Food Industries' advertiser is another organization, whose members have thought long and hard about your business in the course of introducing and applying their products and services to your industry.

If their offerings can improve the quality of your company's product ...or save your company's money... they can contribute to your company's income.

We all know, "It pays to advertise." It pays just as big to investigate *what is advertised!*

...ers ...l... I ...ev in it ...ou an
...r 1...0 ...h r...d...s to in...est

Potato?

Actual laboratory analyses have revealed that some potatoes have several times as much *calcium* as others. Some samples of spinach have ten times as much *iron* as others. Sometimes wheat is rich in *phosphorus*, other times very poor.

Abundant as nature may be in providing mankind with sustenance, she is unpredictable when it comes to supplying essential minerals. To say that any standard food substance is "rich in minerals" has little meaning, unless *that particular sample* has been analyzed for its mineral content. As a result, a diet including, for example, spinach to overcome a deficiency of iron may at times prove of little benefit.

Here is one time that man can "paint the lily" to good effect. Through mineral fortification, a *definite, unvarying* amount of calcium, phosphorus, and iron can be added to bread, cereals, soups, candy and similar staple foods . . . thus providing a dependable supply of these much-needed minerals that is neither lavish today nor niggardly tomorrow.

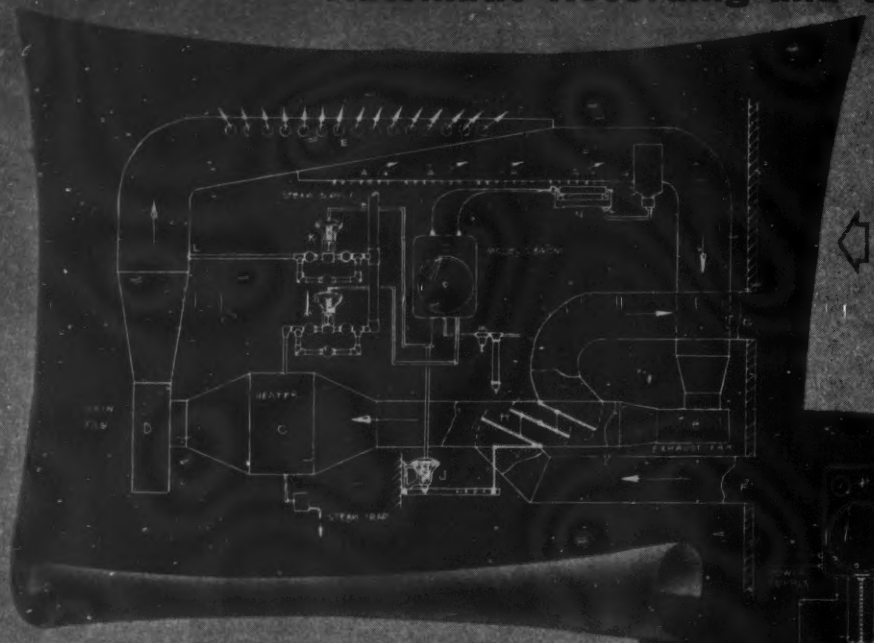
While the available supply of Victor mineral supplements is now used exclusively in war-essential foods, laboratory samples for experimental purposes can be supplied. Now is the time to prepare your product for the stiff post-war competition to come. Our technical staff will gladly lend assistance in solving processing or similar problems. Just write us.

VICTOR
Mineral Supplements

Monocalcium **PHOSPHATE**
Dicalcium **PHOSPHATE**
Tricalcium **PHOSPHATE**
Monosodium **PHOSPHATE**
Disodium **PHOSPHATE**
Iodized Tricalcium **PHOSPHATE**
Sodium Iron **PYROPHOSPHATE**

ARMY

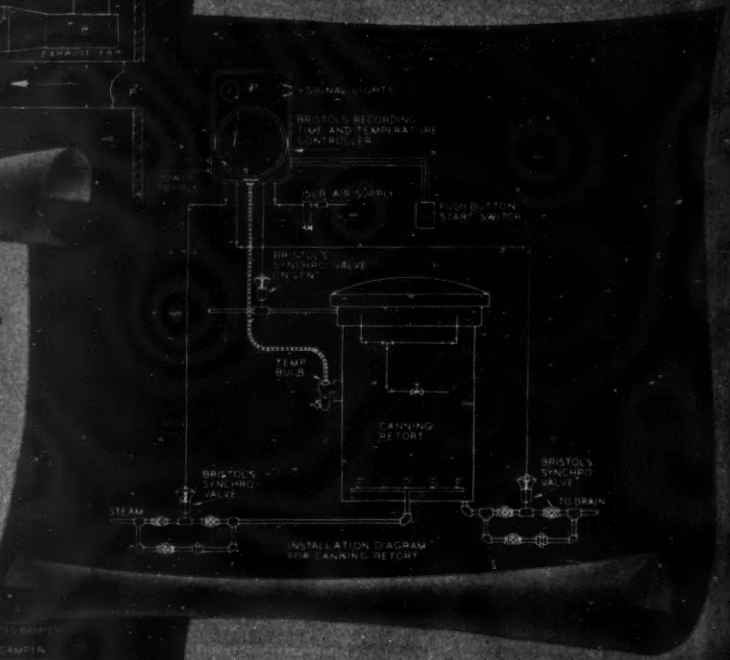
Review of Food Processing in Wartime Reveals Importance of Automatic Recording and Control



Typical Examples:

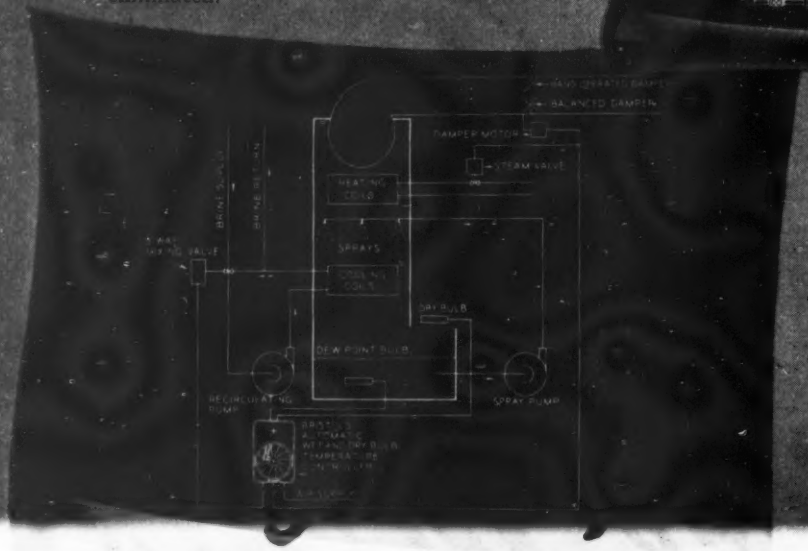
DEHYDRATION

Whatever your dehydration method, Bristol engineers offer you the benefits of wide, practical experience in applying specific instruments to the control of temperature, relative humidity and air flow in food processes. Alert to dehydration developments, they are ready to place the latest, proven facts and figures at your disposal.



CANNING

Bristol's System of Completely Automatic Retort Control operates all phases of the process from the time the containers are put into the retort and the cover is closed until the containers are removed. After the cover is clamped shut, it is only necessary to push a button in the front of the retort. Processing is completely automatic and uniform throughout the batch. Chances for error are eliminated.



MEAT TENDERIZING

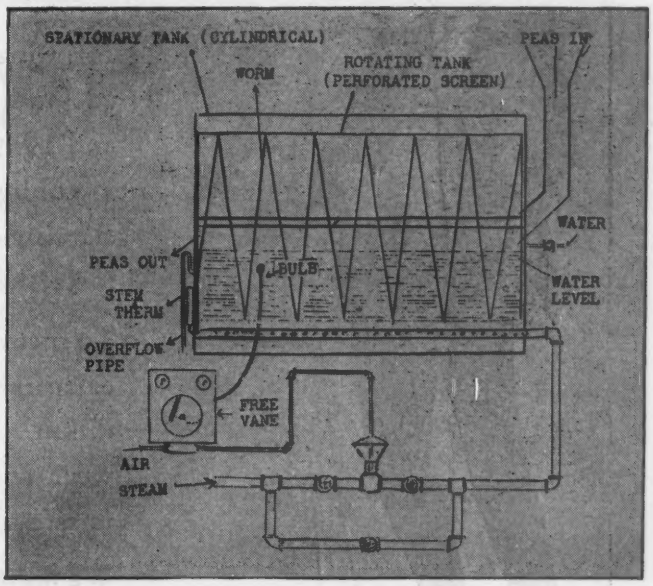
Bristol's automatic temperature and humidity controls on the TENDERAY PROCESS are helping to make possible a better, more palatable product . . . guarded against bacteria . . . with nutritive constituents preserved . . . with grading simpler and more uniform . . . and with the possibility of tremendously increased sales.

MR. CITIZEN!

In their struggle to supply America's food needs against the handicaps of wartime scarcities in food materials and manpower, food processors are turning to experienced instrument-engineering for aid in stopping spoilage, protecting flavor and vitamins, saving fuel, increasing speed of certain operations. Charts on these pages are a partial indication of Bristol's contribution in solving these problems.

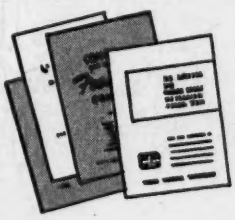
Pioneers in many fields of automatic control, Bristol engineers were first to work with food industries on dehydrated milk processes more than 10 years ago, and first to engineer successful controls for these processes.

In dehydrating, canning, meat-tenderizing, as well as the other food processes . . . wherever temperature, flow, liquid level, pressure, draft, time-of-operation, humidity, vacuum, and pH value must be controlled . . . Bristol's instrument-engineering has eliminated the uncertainties of manual control, and has replaced it with precision regulation.



BLANCHING

In blanching before dehydration, varying temperatures of 190° to 210° (depending on batch size and hardness) had to be held from 2 to 10 minutes. Bristol Free-Vane Controller, operating diaphragm valve in steam line, made constant watching unnecessary, reduced spoilage and fuel costs.



Free Bulletin Service Helps Solve Food-Instrument Problems

- **Bulletin A-112.** Complete facts on the Bristol Free-Vane System of Control, now used in many food plants.
- **Bulletin 550.** Instruments for dairy industry.
- **Bulletin 38.** Automatic control in canning industries.
- **Bulletin 512.** Coordinated controls for plant processes as installed in food, textile, metal, plastics, rubber and other industries.

THE BRISTOL COMPANY

115 BRISTOL ROAD, WATERBURY, CONNECTICUT

The Bristol Co. of Canada, Ltd.
Toronto, Ontario

Bristol's Instrument Co., Ltd.
London, N. W. 10, England

Engineers Process Control for Better Products and Profits

Select the

MR. CITIZEN!

Mr. Citizen ate almost as well in 1942 as he did in 1941 . . . and considerably better than he did between 1935 and 1939. But he won't do so well from now on, for we are obligated to provide foods for our fighting allies and starving civilians abroad as well as for the largest military force this country has ever assembled.

To provide these foods processors must maintain all existing facilities and equipment in sound working condition . . . must restore immediately such facilities when wear and tear, damage or failure have rendered them unsafe or inefficient.

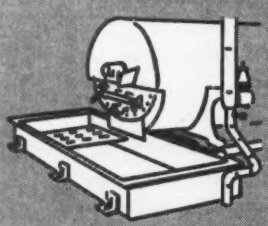
We may be able to help you in your war effort. Consultation is invited.

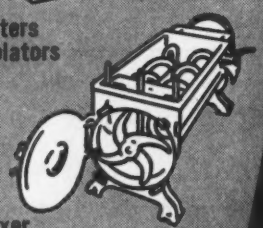
When the War is Won!

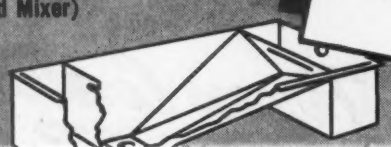
Now is the time to plan against tomorrow's problems. Our 28 years' experience in designing and building food processing equipment is available, without obligation, to help you formulate such plans.

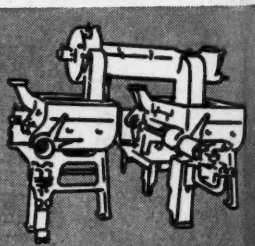
Put Your Mixing Problems up to

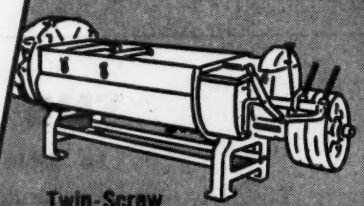
HOTTMANN









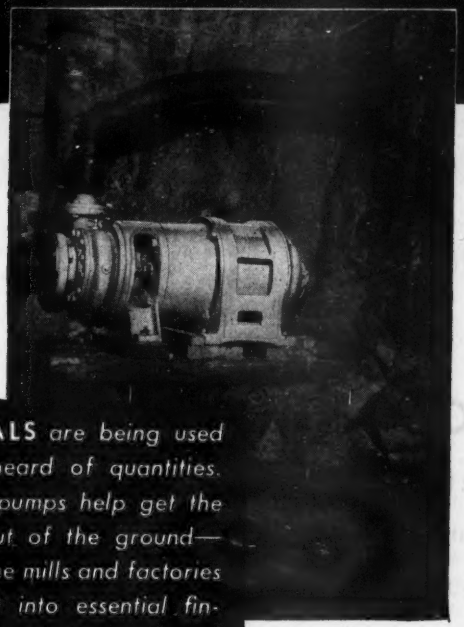


Years of Continuous Engineering Service

CHAS. T. MAIN, INC.

Select the

MOTORPUMP

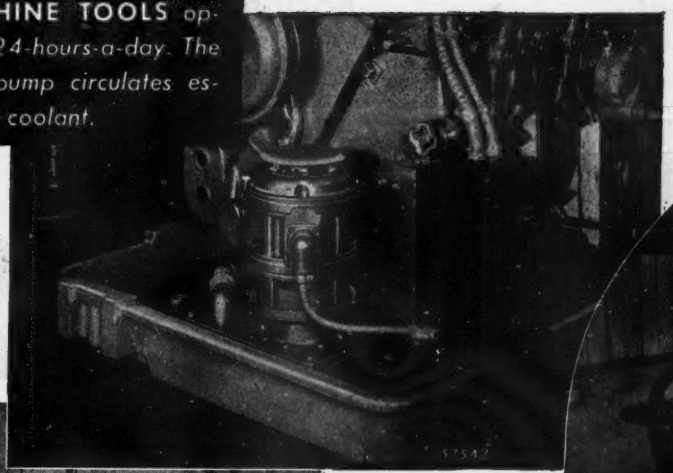


METALS *are being used in unheard of quantities. Motorpumps help get the ore out of the ground—help the mills and factories turn it into essential finished products.*

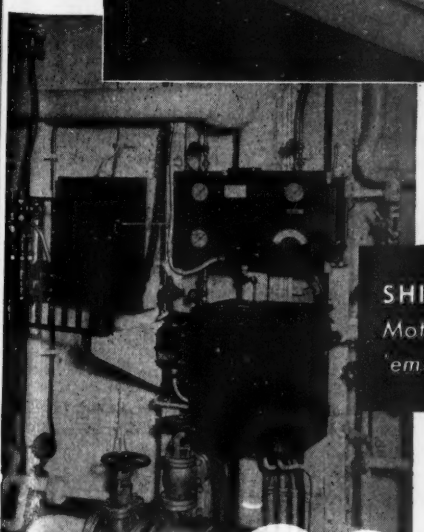
The Motorpump shaft is extra-heavy—its bearings are oversize—pump and driver are a single unit on the same shaft—the stuffing-box is deep and carefully designed. Furthermore, the Motorpump is highly efficient and unusually compact.

It is available in sizes to handle from 5 to 1800 gals per min at pressures up to 215 lb per sq in. Thousands of them are being used in essential production processes to bring water, gasoline, oil and a multitude of other liquids to the right place at the right time.

MACHINE TOOLS *operate 24-hours-a-day. The Motorpump circulates essential coolant.*



REFINERIES *depend on Motorpumps in maintaining an around-the-clock schedule.*



SHIPS *are vital. The Motorpump helps to keep 'em sailing*

ROCCA

Ingersoll-Rand

PRODUCTION FLOW

CHAS. T. MAIN, INC.

ARCHITECTS — ENGINEERS

1893 CHAS·T·MAIN INC. 1943

FOOD DEHYDRATION PLANTS

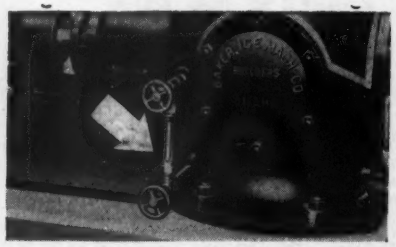
INDUSTRIAL ARCHITECTURE • STRUCTURAL ENGINEERING

STEAM, ELECTRICAL AND HYDRAULIC ENGINEERING

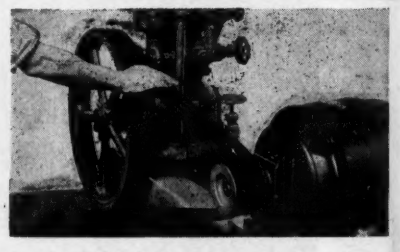
AIR CONDITIONING • REFRIGERATION

DESIGN AND CONSTRUCTION MANAGEMENT

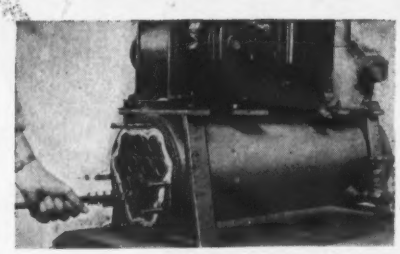
201 Devonshire Street • Boston, Mass.



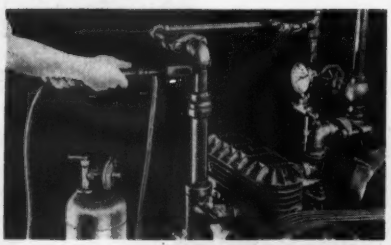
● Make sure your equipment is getting proper lubrication. Use only recommended grade of refrigeration oil in the compressor.



● Check V-belts for proper tension. Keep sheaves clean and properly aligned. Keep oil and grease away from V-belts.



● A clean condenser saves power. BAKER service men have special tools for freeing tubes of sludge and scale.



● Have BAKER'S service man give valves, gaskets, condensers, etc., a professional leak-inspection. Prevents costly waste.

● Today, an expert valve-checkup is a *must*. Gas-tight compressor valves are necessary to attain full cooling capacity.

BAKER

COMMERCIAL AND INDUSTRIAL REFRIGERATION EQUIPMENT

Have inspections made by your BAKER service man regularly: have any needed replacement parts installed promptly.

Conserve Labor!

ROCCAL

TRADE MARK REG. U.S. PAT. OFF

MODERN SANITIZING AGENT FOR THE FOOD INDUSTRY

SANITIZE all surfaces coming into contact with food in the packing process by washing with a solution of 1-ounce ROCCAL to 5-gallons of water.

USE ROCCAL FOR—

Poultry Packing Equipment • Cookers
Egg Breaking Equipment • Truck Racks
Food Chutes • Commercial Refrigeration

- **Non-Corrosive . . . *saves metal & rubber***
- **Active at Low Temperatures . . . *saves fuel***
- **Highly Germicidal . . . *keeps bacteria counts low***
- **Non-Irritating . . . *kind to hands***
- **Highly Stable . . . *does not deteriorate in storage.***

ECONOMICAL TO USE

As a Sanitizer..... 1-oz. to 5-gallons of water
As a Spray..... 1-oz. to 1-gallon of water
For Mopping..... 1-oz. to 2-gallons of water

ROCCAL is also an Effective Germicide for *Floors, Locker* and *Shower Rooms.*

LITERATURE & SAMPLE AVAILABLE

WINTHROP CHEMICAL COMPANY INC. SUCCESSOR TO
ALBA PHARMACEUTICAL DIVISION
170 VARICK STREET, NEW YORK, N. Y.

Make flavor go further with D&O

SPICEOLATES

"SOLUBILIZED" SPICE OIL FLAVORS

Solve one of today's big supply problems resulting from governmental restrictions on the use of spice oils with . . . SPICEOLATES.

These fine spice flavors can be used with considerable advantage—not only in replacing completely the dry spices you may now be using—but also to extend your present spice supplies.

WRITE US WITHOUT DELAY!

★

D&O ESTABLISHED 1938

VON'T CONVERSION TO GLASS CONTAINERS NECESSITATE ALL NEW EQUIPMENT.

PRODUCTION FLOW

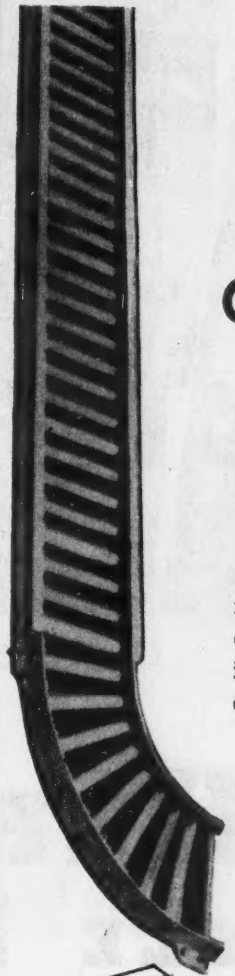
with

DAMROW

engineered

POWER or GRAVITY

CONVEYORS



In the fast-flowing production lines of many Industries today you'll find the results of DAMROW engineering skill in moving materials faster . . . . Compact, efficient, smooth-working conveyor systems that save man-hours, make floor space pay higher dividends, streamline many processing operations for the quick delivery of "MORE—SOONER" that is our big job now.

WHAT'S *YOUR* PROBLEM?

Is it moving products between operations—loading or unloading—floor to floor transfer —putting more production-flow in in limited space—assembly-line or packing-line "feeding"—continuous assembly conveying. DAMROW Engineers may offer a profitable solution to these and many other problems in YOUR plant. Write today!

DAMROW BROTHERS CO.

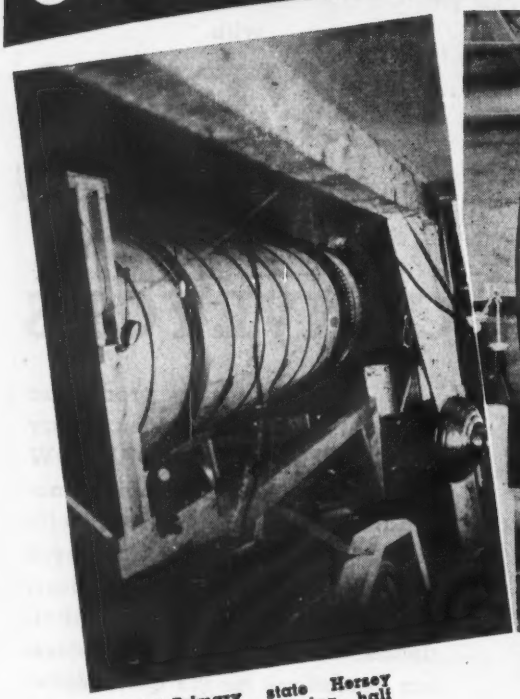
PROVIDE AT NOMINAL RENTAL

Custom-Designers of HANDLING STORAGE and PROCESSING

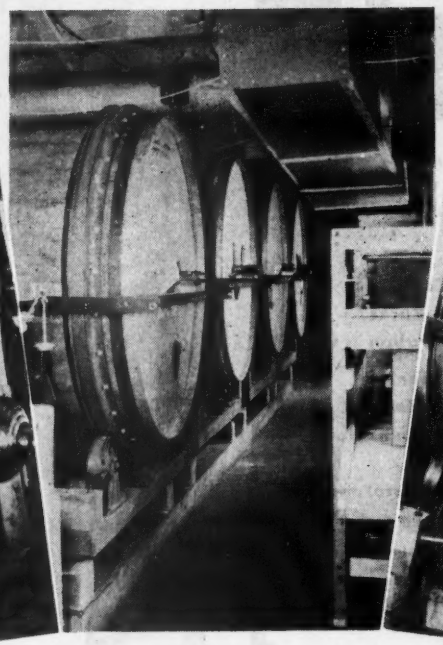
Continuous ... Labor!

COMMERCIAL AND INDUSTRIAL DEHYDRATION EQUIPMENT

Have inspections made by your BAKER service ... regularly: have any needed replacement parts installed promptly.



(a) Primary state Hersey Dehydrator removing half the moisture.



(b) Four secondary stage Hersey Dehydrator.

(c) Dried potatoes being discharged from a secondary stage Dehydrator.

HERSEY
VEGETABLE DEHYDRATOR

Above photographs show the Hersey in operation in Westfield, Maine

• CONTINUOUS IN OPERATION taking the product in continuous flow from the last washer and discharging without further attention to the packaging room

COMPLETELY AUTOMATIC in movement of product, temperature control and cycle time NO OPERATORS NEEDED

UNIFORM TREATMENT because the product is in motion and is being turned over constantly Every particle receives exactly the same treatment

Constructed of

NON-STRATEGIC MATERIALS such as wood, cast iron, etc., wherever possible

• *Send for Catalog Today*

HERSEY MANUFACTURING CO.

Employed by U.S.A. in the WAR EFFORT

Dehydrated Food Products

Food Processing

WON'T CONVERSION TO GLASS CONTAINERS NECESSITATE ALL NEW EQUIPMENT, MR. KNISELL?
PROVIDE AT NOMINAL RENTAL
STORAGE and PROCESSING

It's simple. Yes—and it's inexpensive, too. Switching from critical cans to non-critical glass, we mean. Often, the only equipment additionally needed is a sealing machine. We'll provide that for you—at nominal annual rental. Or, in some cases, slight changes in your present equipment may be required. Our Packaging Engineers will be happy to help you. They'll get you straightened away in no time.

So remember Anchor Hocking. No matter what you pack—solid, semi-solid, powder or liquid; or how you pack it—hot or cold, with or without vacuum, sterilized or processed—we can supply you with standard containers and closures you'll call "custom-built for my every requirement!"

EDWARD L. KNISELL, one of Anchor Hocking's ablest and most popular men, has been a member of the Anchor Hocking family for 25 years.

ANCHOR HOCKING

GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION LANCASTER, OHIO

Dehydrated
Food Products

Weighing and packaging 5-lb cans of dehydrated potatoes in the plant of E. A. Coutre Dehydrator, Modesto, California.

Fruit and Vegetable Packaging . . .

Man power shortage, short ocean shipping space, and lack of tin for canning have forced new processing methods . . . revolutionary new packaging of fruits and vegetables in particular. No food products thus far created by man and necessity lend themselves more completely to modern EXACT WEIGHT packaging than present day dehydrated food products. What is required is handling smaller containers, light in weight, with speed and accuracy. EXACT WEIGHT high speed scales are ideally fitted for this task of volume production in short efficient day or night shifts with profitable results. Write for full details for your operation today.

THE EXACT WEIGHT SCALE COMPANY

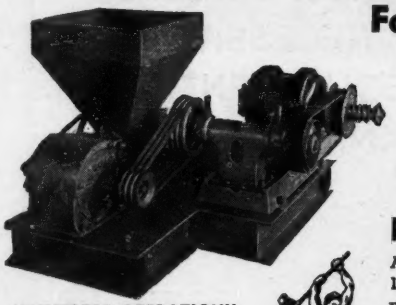
21 W. Fifth Ave., Columbus, Ohio

ACTURING CO.

Employed by U.S.A. in the WAR EFFORT

Food Processing Equipment

Meeting Different Products and Capacity Requirements



MASTER PULVERIZER

Adjustable from 30 mesh to 100 mesh and finer—a most popular type of pulverizer for food products, cocoa, sugar, grains, spices, whole wheat flour grains, etc.—Write our Engineers.

"DUSTLESS OPERATION"

Requiring no auxiliary separators, fans or collection attachments.
"Built in Many Sizes"

"Illustrated Bulletin on Request"

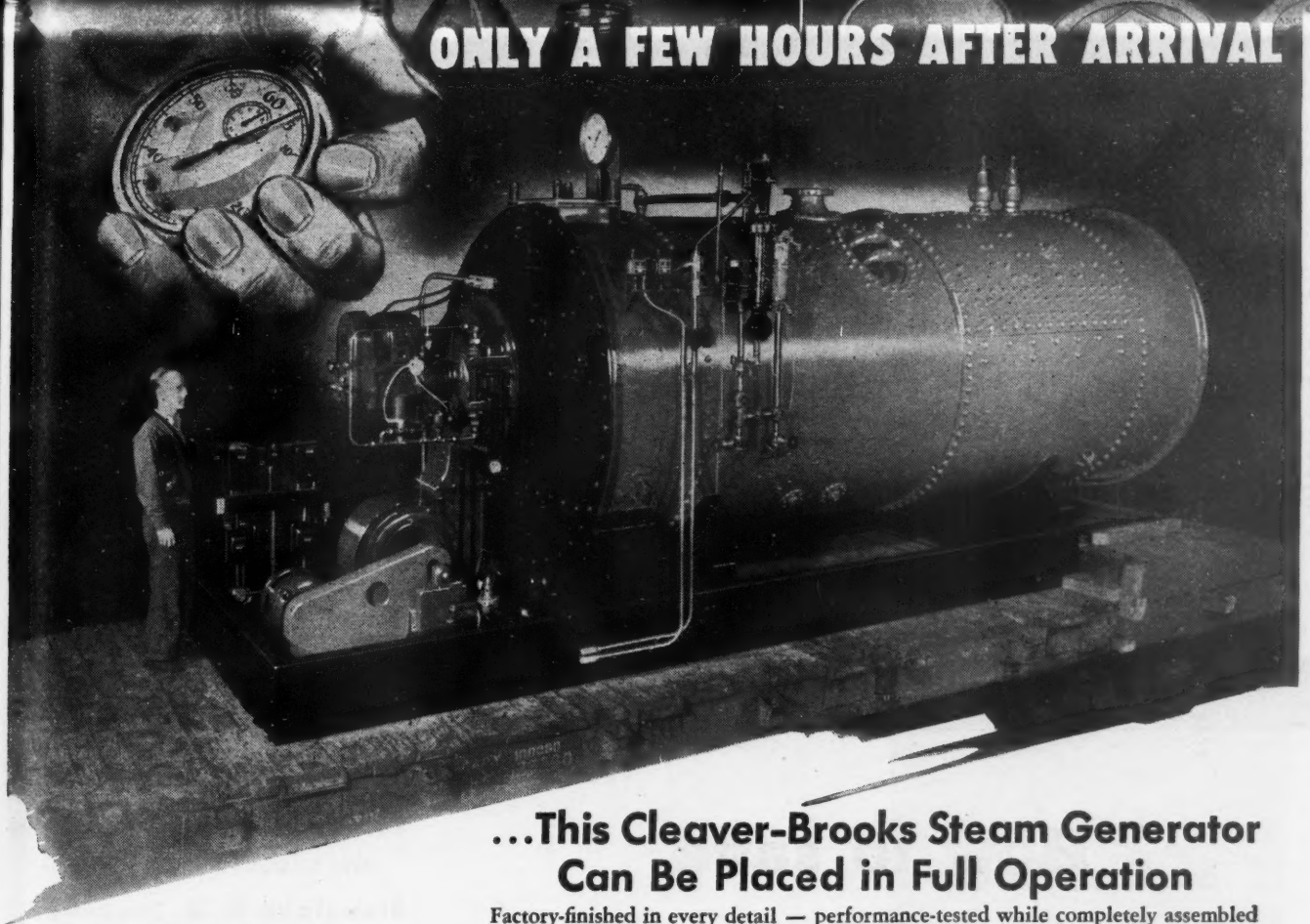
GRUENDLER
ST. LOUIS, U.S.A.
GRUENDLER
OUR FIFTY-EIGHTH YEAR

GRUENDLER CRUSHER & PULVERIZER CO.
PLANT and MAIN OFFICE—2915-17 N. MARKET • ST. LOUIS, MO.

This is the Famous
LEE
PROCESSING KETTLE
Serving America's Navy, Army, Victory Fleet —everywhere . . . and serving them well!
Corrosion and metallic contamination resistant . . . stainless and easy to clean. LEE Stainless Processing Kettles, Tanks and Equipment are built for . . . and give . . . faster, more efficient processing! Do you have the LEE catalog?
LEE METAL PRODUCTS CO., Inc.
416 Pine Street • Phillipsburg, Penna.

										11.5
License & Insur.	5.6	5.6	14.8	9.3	8.7	11.0	13.03			9.2
Depreciation...	21.0	12.2	19.7	20.1	19.4	24.0	17.95	28.3		20.3
Gasoline.....	19.3	14.5	15.3	32.5	38.5	28.2	34.04	22.0		25.5

ONLY A FEW HOURS AFTER ARRIVAL



A Cleaver-Brooks Steam Generator Just Out of Factory Test-Pit—Ready for Shipment When Blocked and Trim Removed.

...This Cleaver-Brooks Steam Generator Can Be Placed in Full Operation

Factory-finished in every detail — performance-tested while completely assembled — and shipped as a complete ready-to-operate unit — the installation of a Cleaver-Brooks steam generator is only a matter of hours, rather than weeks of time. A job that is usually costly in time and money is reduced to a few simple piping and electrical connections.

These modern oil-fired steam generators are the answer to the demand of American industry and the military services for a steam plant with these advantages:

- —greatest fuel economy — 80% efficiency guaranteed.
- —quick steaming—for any emergency or fluctuating loads.
- —clean — no smoke, ashes, soot or clinkers.
- —compact "packaged" construction saves space.
- —positive blower air supply eliminates high, costly stack; only a simple, short vent is required.
- —four-pass down-draft construction gets all possible heat from fuel.
- —one source and one responsibility for the complete unit — Cleaver-Brooks.

Whatever your present or future need for steam — within the range of a single installation (20 to 500 HP. — pressures 15 to 200 lbs.) or that of a battery of Cleaver-Brooks Steam Generators, secure full information now in anticipation of the time when normal conditions return.

CLEAVER-BROOKS COMPANY, 5103 N. 33rd St., Milwaukee, U.S.A.

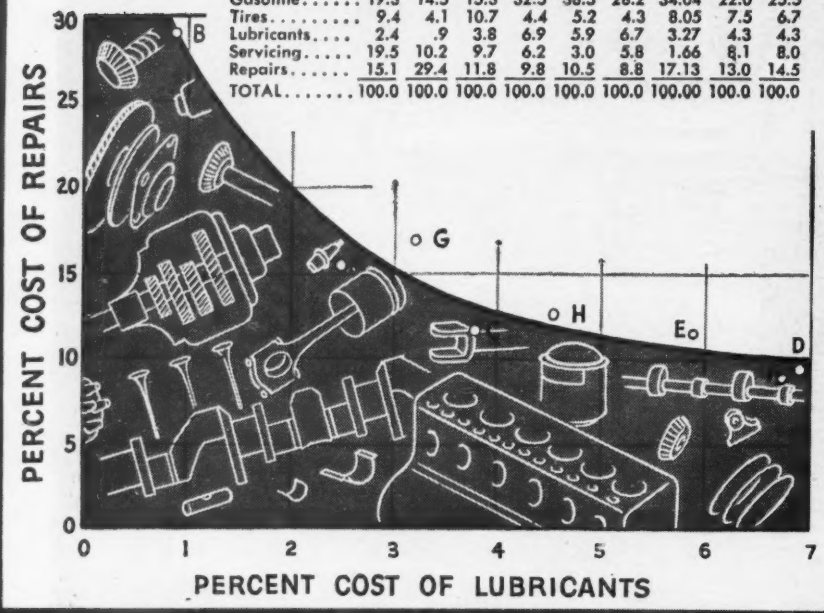
WHY INSTALLATION TIME IS CUT!

- ✓ *No Stack*
- ✓ *No Brickwork*
- ✓ *No Special Foundations*
- ✓ *No Breeching*
- ✓ *No Multiple Sources of Supply*

Cleaver-Brooks
STEAM GENERATORS

CLEAVER-BROOKS PRODUCTS INCLUDE:

									11.5
License & Insur.	5.6	5.6	14.8	9.3	8.7	11.0	13.03		9.2
Depreciation...	21.0	12.2	19.7	20.1	19.4	24.0	17.95	28.3	20.3
Gasoline.....	19.3	14.5	15.3	32.5	38.5	28.2	34.04	22.0	25.5
Tires.....	9.4	4.1	10.7	4.4	5.2	4.3	8.05	7.5	6.7
Lubricants....	2.4	.9	3.8	6.9	5.9	6.7	3.27	4.3	4.3
Servicing.....	19.5	10.2	9.7	6.2	3.0	5.8	1.66	8.1	8.0
Repairs.....	15.1	29.4	11.8	9.8	10.5	8.8	17.13	13.0	14.5
TOTAL.....	100.0	100.0	100.0	100.0	100.0	100.0	100.00	100.0	100.0



KEY

A—Oil Co. Survey of Several Fleets, Av.
B—Large Public Utility Fleet
C—Scattered Fleet of 400 Vehicles
D—Scattered Fleet of 300 Coupes
E—Scattered Fleet of 450 Cars
F—Fleet of 300 Half-Ton Pickups
G—Autocar Company's Report (Adjusted)
H—"Composite" Iowa Automobile Costs

How to save scarce parts and labor

• GRAPHIC EVIDENCE that scarce parts and labor can be saved by good lubricants is given in the chart above. It represents the experience of many fleets, as shown by the table. Note that in practically all instances, fleets that spent more for lubricants had lower repair expense—also a much lower total of lubricants plus repair costs than the other fleets.

That was important, even in normal times. But today, with repair parts and labor both hard to get, the cost of lubricants is even less important. The only question is, "How much will it save on maintenance?"

Doesn't that suggest the first step to take in your preventive maintenance plan? Find out exactly what your costs are for repairs and for lubricants. Then work toward adopting lubricants that will lower the total of *both*.

Here's how a Standard Oil Man can help you. He can recommend lubricants that will help reduce wheel bearing maintenance and chassis repairs, or motor oils that will eliminate troublesome varnish and engine deposits. From his experience with these products on other fleets, he can help you save both scarce parts and labor. Call any local Standard Oil (Indiana) office, or write 910 S. Michigan Ave., Chicago, Ill. In Nebraska, call any Standard Oil Company of Nebraska office.

Start saving with one of these detergent-type oxidation-inhibited motor oils.

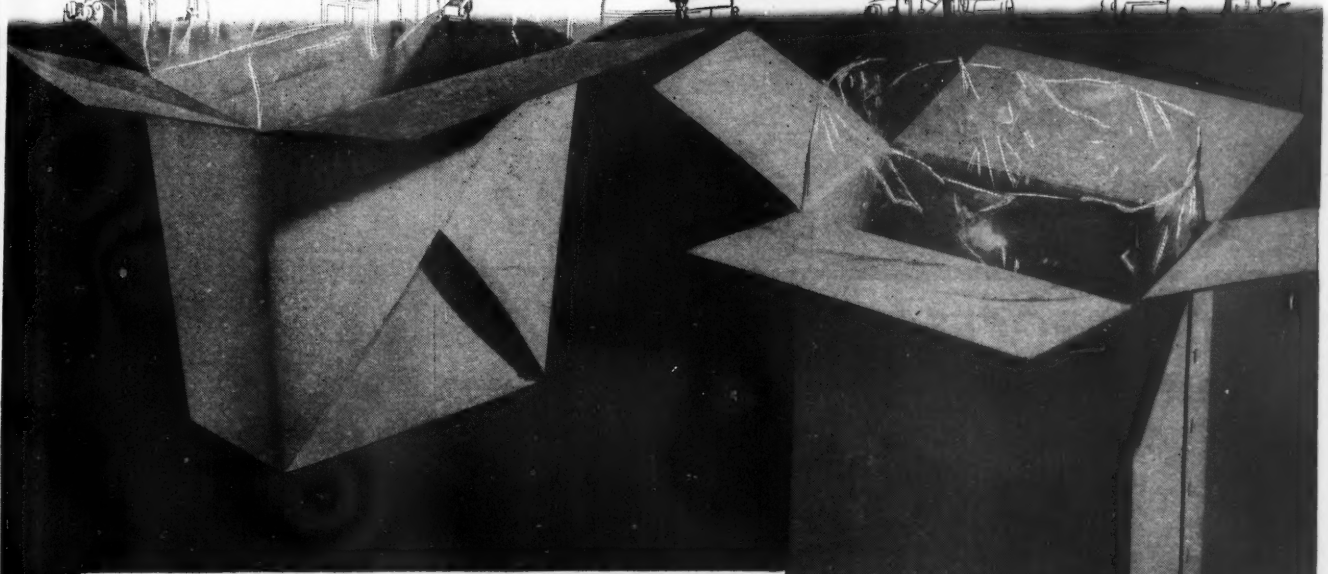
Stanolube H.D. This heavy-duty oil for gasoline and Diesel engines is available only to the U. S. Government and fleet operators. It represents our most advanced development in an oxidation-inhibited, detergent-type oil for protection against varnish, engine deposits, and the resultant overhaul and maintenance expense.

Standard Bus and Truck Oil. Designed for moderately heavy-duty service in gasoline or Diesel-powered trucks and buses where its detergency and oxidation-inhibited quality assures cleaner engine operation than can be obtained with conventional type motor oils.

A Standard Oil representative can advise you which of these war-duty oils is best fitted for your equipment.

Oil is ammunition . . . Use it wisely

to dozens of your questions in the food field in



Metal replacement packages for frozen food institutional packs

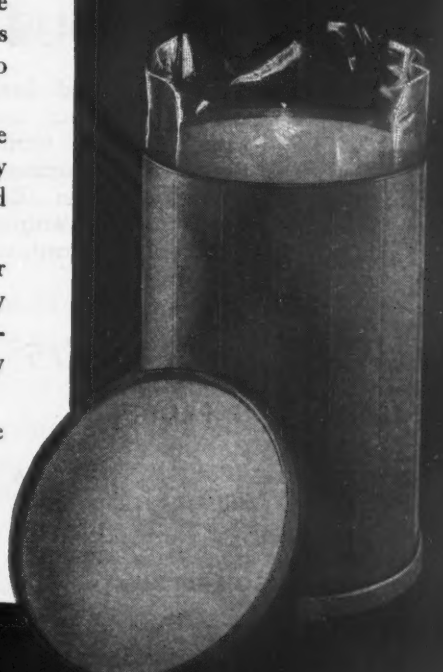
THE DU PONT
CELLOPHANE BAG-IN-BOX

The new Cellophane bag-in-box container—available in the various types and sizes illustrated—offers excellent possibilities as a replacement for the metal containers formerly used to package institutional packs of frozen foods for civilian use.

These new units follow logically in the footsteps of the Cellophane consumer size unit—which, over a period of many years, has proved its protective value against dehydration and spoilage of frosted fruits and vegetables.

A sturdy, leakproof Cellophane bag is ideal protection for the product, and a fibreboard carton provides the necessary structural strength. These units are easy to handle in all production operations—loading, unloading, and freezing. They are efficient and economical.

E. I. du Pont de Nemours & Company (Inc.), Cellophane Division, Wilmington, Delaware.



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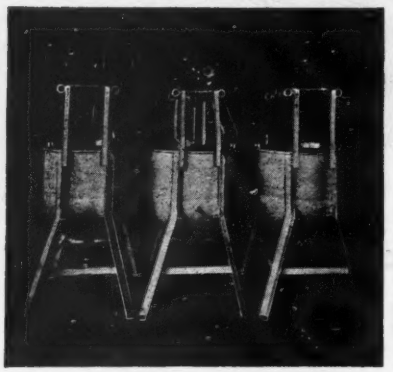
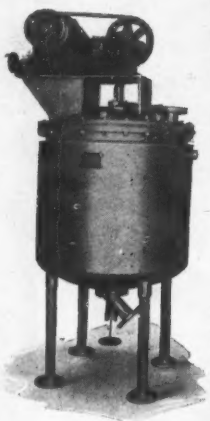
Edge Moor "Stainless" steel mixing and processing equipment can be produced to meet the strictest specifications in rapid time under a guarantee of satisfactory workmanship and performance. Edge Moor shops possess every tool needed to do the most exacting work.



● STAINLESS STEEL COOKING KETTLES WITH SCRAPING AGITATION FOR FOOD DEHYDRATION PLANT



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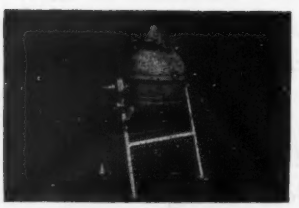

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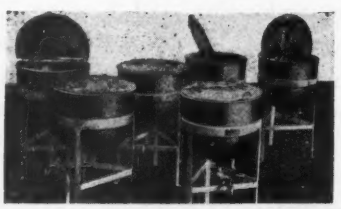

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In war or peace the need for food is always with us. Unfortunately in normal times its abundance is too often accepted as a matter of course. Now however, with our Country at arms, we have become acutely conscious of nutrition's imperative call. In our march to victory none escape the need for strength and vitality. To answer this demand a vast home-army labors on the land working with Nature to satisfy hearty appetites. Certainly the products of farm and ranch are too vital to be denied preservation of the highest order. During transit and in storage the need for protective packaging is definitely obvious. Supplying a wide variety of specialized protective papers to satisfy this critical service is the all-important objective at the Rhinelander paper mills.

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We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington, Delaware.

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meet increased demands. The situation is not so fortunate with textile bags as there appears to be a deficit of several hundred million yards of textile bag material between the supplies and the demand.

There is plenty of capacity for the manufacture of tight cooperage as the industry is operating at only about 50 percent. But the manufacturers are having difficulty in obtaining staves. This condition may be corrected shortly so that all demands can easily be taken care of.

There are insufficient lumber supplies to enable the nailed wooden box industry to operate at capacity. The manufacturers of wire-bound boxes are operating at only 50 percent capacity, due to a shortage of veneer. Wire-bound boxes are obtainable only on extremely high ratings, and many users of this type of container on domestic shipments will be forced to other types of packaging.

In regard to corrugated and solid fibre containers, there is some disagreement about the supply situation, but Mr. Sheldon believes that before the end of this year there will be shipping containers for everybody.

Certain grades of protective papers needed to make tight and moisture-proof cartons are scarce. Paper can demands are far ahead of production, but new facilities will give some relief in the next sixty to ninety days, and this also applies to fiber cans.

Grade Labeling Issue Debated

OPA factions split on mandatory grade labeling; 1943 pack labeling seen in doubt

CONSIDERABLE confusion still surrounds the grade labeling issue, with pressure groups plugging both sides of the question and OPA a house divided. Within OPA officials are lining up behind either Deputy Price Administrator J. K. Galbraith, an old-line Henderson man who favors mandatory grade labeling, or Deputy Administrator in Charge of

(*Continued from page 86*)

Product	1943 packing quota	Closure material indicated by X: Tin-plate	Black-plate	Rubber
Nut butters	Unlimited	..	X	..
Soups, dehydrated	Unlimited	..	X	..
Spice, and seasoning	100% 1942	X	..	..
Vinegars	Unlimited	X	..	..
Special food products, for human consumption only, limited to foods other than usual table foods. Quota: No person shall pack any special food product unless he packed the product in substantially the same form in 1942, and unless he obtains prior permission upon application to the War Production Board	(2)	(1)	(1)	(1)

[1] During 1943 only.
[2] Until Mar. 31, 1943.
[3] See product column.

NOTE.—When required for the packing of other products, pineapple may be repacked from No. 10 cans. Grape juice may be repacked from reusable cans, 5 gallons or larger.

*Whenever the asterisk appears the packing quota relates to the number of closures and cans used for packing the applicable product.

BEVERAGE CLOSURES

Product—Bottling quota	Closure material
Product: Malt beverages, including only beer, ale, porter near-beer, and mixtures thereof. Quota: Any person who produced in 1941 less than 65,000 barrels may use in any calendar month, commencing with December 1, 1942, 100 percent, and any person who produced in 1941 over 65,000 barrels may use in any calendar month, commencing with December 1, 1942, 70 percent of the number of closures affixed by him to glass containers during the corresponding month of 1941. In the case of a person who packed all or part of his 1941 production in cans, each such can may be counted as a closure affixed to a glass container. In the case of a person who did not produce any malt beverages in 1941, such beverages bottled by him, shall be considered as having been produced by him, and his authorized usage of closures shall be calculated accordingly.	Tinplate and blackplate allocated for purposes of crown manufacture, only, and in inventory of crown manufacturer or bottler on or before December 11, 1942. Also rejects and electrolytic waste-waste.
Product: Non-alcoholic beverages, including only carbonated soft drinks; non-carbonated soft drinks; unflavored carbonated waters; unflavored naturally carbonated and still waters; drinks consisting of fruit juices, vegetable juices, and combinations thereof, where less than 85 percent by weight of such drinks is pure fruit juice, vegetable juice, or a mixture thereof; and sterilized milk drinks made with powdered milk. Quota: Any person who used in 1941 less than 5,000 gross of closures, may use during any calendar quarter, commencing with October 1, 1942, 100 percent of the number of closures affixed by him to glass containers during the corresponding quarter of 1941. Any person who used in 1941 more than 5,000 and less than 7,000 gross of closures, may use not to exceed 5,000 gross of closures in any twelve-month period, commencing with October 1, 1942; the number used during any calendar quarter to be at the same proportionate rate he affixed closures to glass containers during the corresponding quarter of 1941. Any person who used in 1941 more than 7,000 gross of closures, may use during any calendar quarter, commencing with October 1, 1942, 70 percent of the number of closures affixed by him to glass containers during the corresponding quarter of 1941.	Tinplate and blackplate allocated for purposes of crown manufacture only, and in inventory of crown manufacturer or bottler on or before December 11, 1942. Also rejects and electrolytic waste-waste.

(1) No person, other than a jobber purchasing for resale, shall accept delivery of malt beverage or non-alcoholic beverage closures which would increase his inventory beyond 20 percent of the number of such closures and cans which he used in 1941 for packing malt beverages and non-alcoholic beverages.

(2) Closures for waters. Except with regard to items listed in Schedule II, no closures made of tinplate, terneplate, or blackplate shall be affixed to glass containers smaller than 12 fluid ounces, for packing unflavored carbonated, natural or mineral waters, unless such glass containers were manufactured on or before June 1, 1942.

(3) All persons who bottle malt beverages or non-alcoholic beverages, shall report upon Form PD-519 to the Containers Division, War Production Board, Washington, D. C.

Information, Lou R. Maxon, who has come out against the regulation. Although the House Agricultural Committee on April 7 voted unanimously against grade labeling of the 1943 pack of canned fruits and vegetables, on the same day OPA extended its mandatory grade labeling program to include canned snap beans. Grade labeling has previously been ordered for canned grapefruit juice, peas, corn and tomatoes.

Following the congressional hearing, consumer, labor and women's organizations proposed to Price Administrator Brown that either he go through with his announced program to require grade labeling for all canned goods, or that he establish one standard price at the "standard" or Grade C level for each canned product. If this plan is adopted, only canned goods which carry Grade A or Grade B labels would be permitted to sell at higher than standard prices. The proposal was sent to Brown after the House committee voted to recommend to Brown that if grade labeling would reduce the size of the pack then it be not required on the 1943 pack.

The unions are the latest group to support the Galbraith faction, with William Green, President of the A. F. of L., calling on Price Administrator Prentiss Brown to carry through his original program. Industry and canning interests are opposing the regulation on the grounds that it will cause price confusion, and the Label Manufacturers' National Association is opposing OPA's plans, claiming that most of the labels for 1943 use are already in the hands of the packers and there would not be time to have them returned and changed in time to be used this year. However, Washington observers believe that when the smoke clears, Prentiss Brown will indorse the mandatory grade labeling principle.

Dr. Prescott Wins Appert Medal Award

IN RECOGNITION of his services to the advancement of food technology, Dr. Samuel Cate Prescott will receive the Nicholas Appert Medal of the Institute of Food Technologists at the Institute's annual banquet, June 3, in the Statler Hotel, St. Louis. Since his retirement as dean of science at Massachusetts Institute of Technology, Dr. Prescott has been serving as consultant to the dehydration committee of the U. S. Department of Agriculture and to the research laboratories of National Canners Association.

In making the award this year the Institute is honoring Dr. Prescott for a lifetime of research and experiment in the food field.

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REMOVAL of priority restrictions on the sale of Mundet Cork Insulation now makes this unsurpassed insulating material available for all low-temperature uses. ¶ This action is good news for refrigeration engineers and operators. Cork's pre-eminence in meeting war needs has been fully recognized. Now that sufficient stocks of raw cork have been accumulated to assure these vital uses, and with fresh shipments arriving regularly, Mundet Cork Insulation is once more available for commercial applications. ¶ The qualities in Mundet Cork Insulation that caused it to be specified for important war projects recommend it also wherever low temperature must be controlled and conserved most economically. Mundet Cork Corporation, Insulation Division, 65 South Eleventh Street, Brooklyn, N. Y.

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OPA Price Regulations

Fluid Milk—Amendment 3 to MPR 329, released April 8, extended indefinitely the nationwide emergency ceiling placed February 13 on prices which fluid milk distributors and handlers might pay to farmers for milk for resale as fluid milk. Prices are frozen at the highest January, 1943, level.

Spinach; Grapefruit Juice—The 1943 pack of spinach was brought under specific dollars-and-cents maximum prices per dozen cans by OPA at levels which prevailed for the 1942 pack in Amendment 7 to MPR 306, issued April 12. At the same time, OPA set specific dollars-and-cents maximum prices for grapefruit juice packed in glass. In January, 1943, OPA established ceiling prices for grapefruit juice in glass. The prices in the present amendment are on the same basis adjusted for glass pack.

Tunafish—Launching a price control program on fresh fish for the first time in a further measure designed to halt the rising cost-of-living, Prentiss Brown on April 13 placed ceilings on four species of tuna and two tuna-like species when sold by fishermen. Effective April 19, 1943, the new ceilings for fresh tuna approximate present levels for yellowfin, bluefin, skipjack, yellowtail and bonito.

Bread Crumbs—Because under the original order on bread crumbs, many producers' ceilings, after packaging and transportation costs have been tacked onto the base maximums, were the same as the retailers' ceiling, OPA on April 13 issued an order allowing retailers to add packaging or transportation costs to their maximum prices to permit them a fair margin. Effective April 19, the new Amendment 158 to Supplementary Price Regulation 14, GMPR, clarifies the original intent of the order.

Canned Snap Beans—OPA on April 7 established specific dollars-and-cents maximum prices per dozen cans for canned snap beans at levels approximately those of 1942. The Amendment 6 to MPR 306, effective April 7, provides there will be no increase in the price of canned snap beans at retail. Both wholesale and retail prices for the commodity are figured on a fixed mark-up basis.

Cheese—Amendment 19 to MPR 280 provides that sellers of cheese, with certain exceptions, may add 3 cents per pound to the maximum price. This 3-cent increase may not be applied to those stocks of cheeses which were in the sellers's possession prior to Feb. 10, 1943. However a cheese factory may apply this increase to cheeses which it has manufactured and delivers on or after Feb. 10, 1943, regardless of whether such cheeses were manufactured before or after that date.

Dairy Products—Amendments 8, 10 and 11 to MPR 289, issued April 2, revise ceiling prices for industrial casein, cheddar cheese and bulk butter. Maximum prices for wet curd acid-casein, wet curd rennet-casein, dry acid-casein, dry rennet-casein and whey powder are reestablished in Amendment 8. A ceiling price is fixed for cheddar cheese sold in the state of Wisconsin, and for cheese sold outside the state, in Amendment 10. Amendment 11 to the original order sets a series of maximum prices for different grades of bulk or unprinted butter in different locales of the country.

Processed Food Commodities—Order 375 under 1499.3 of GMPR sets forth a pricing formula for processed food commodities subject to GMPR and establishes a mark-up system for the commodities. The order requires a producer to report his maximum prices to OPA within 10 days after determining them in accordance with the revisions.

Eastern and Gulf Oysters—OPA on March 23 lifted the canner ceilings on canned eastern and Gulf oysters 20 cents per dozen cans on the No. 1 picnic size and 45 cents per dozen cans on the larger No. 2 picnic size. The canner pricing change, when supplemented by fixed mark-ups at wholesale and retail, will result in an increase of approximately two cents per can to the housewife.

Meats and Fats Rationing—Foods rationed under the new meats and fats program beginning March 29 will be available to industrial users in 1943 in amounts approximating 70 percent of the total poundage used by them in corresponding periods of 1942. The new meats and fats rationing regulations (Ration Order 16) provide for point allotments to industrial users during quarterly allotment periods, the first being the April-May-June period.

Soybeans—Choice soybeans specially cleaned for use in the production of food products not involving the extraction of soybean oil were exempted from price control on March 26, in amendment 2 to MPR 331. The order will affect such products as salted soybeans.

Canned Turkey Meat—To encourage production of canned turkey meat for military needs, OPA on March 25 issued amendment 1 to MPR 269 authorizing turkey canneries producing for the United States and buying turkeys on an f.o.b. basis to pay prices established for the sellers' shipping point. The new amendment should facilitate movement of turkey stocks in storage in Utah, Oregon and Washington to the large midwestern canneries.

Sirups and Molasses—Packers of sirups and molasses, who previously paid premiums over existing market prices for certain items among these commodities because of special quality or flavor were authorized in Amendment 4 to MPR 291 to apply for permission to continue paying these premiums, with the understanding that the extra cost would not be allowed to be reflected in the packer's selling price.

Dried, Dehydrated Fruits—All dried and dehydrated fruits were temporarily removed from rationing, and point values of all fruit

and vegetable juices and dehydrated soups were lowered sharply in the first revision of point values under OPA's rationing program, effective March 29. The new order raises from March levels the point values of applesauce, peaches, pineapple, canned fresh lima beans and other items.

Canned Meat—Producers of canned meats who were pressed for storage space to hold stocks accumulated during the recent freeze on sales have benefited from amendment 2 to Restriction Order 3, announced March 19, permitting any person to make limited transfers to wholesalers. Transfers are limited in quantity to 50 percent by weight of the total of any person's canned meat inventory at the close of business on Feb. 17, and 50 percent by weight of stocks produced or acquired by him since that date.

Packers' Tin Cans—OPA on March 26 issued MPR 350 to avert increased consumer costs of commercially processed foods by fixing producers' ceiling prices of packers' tin cans at levels that have prevailed in general for the past three years. Maximum prices for wide-mouth glass containers will be issued soon.

Packaged Skim Milk—Amendment 9 to MPR 229, effective April 12, sets maximum price ceilings on packaged skim milk at the packer level. Packers, with high price ceilings on packaged skim milk during the Sept. 28- Oct. 2, 1942, base period of individual price freeze, will find their new maximums cut back approximately 7 cents to 16 cents per dozen packages. Four zones are set up for packaged skim milk in the new order.

Canned Corn—A new table for computing the price ceilings on grades of canned corn was issued on March 31 in amendment 5 to MPR 306. In the same order new regions were designated for fixing price ceilings for the product.

Frozen Fish and Seafood—Maximum prices were established on April 7 for frozen fish and seafood, in MPR 364. A complete table appended to the order includes a formula for determining processors' and wholesalers' ceiling prices for all varieties of frozen fish.

Packaged Honey—Specific cents-per-pound maximum prices for packaged honey were established on March 29 in Amendment 4 to MPR 275, establishing an alternative pricing method for packers. The new alternative is set on a basic maximum price of 21 cents for a 1-lb. package sold to a wholesaler. At the same time it was announced that sales of packaged honey at wholesale and retail would be placed under mark-up restrictions.

Canned Boned Turkey—According to amendment 7 to MPR 269, issued March 25, when any person sells a turkey item to a purchaser who cans boned turkey meat for sale to the government, he may sell at his maximum base price f.o.b. his shipping point without subtracting his "freight rate" from the place where the shipment begins to the place where the shipment ends.

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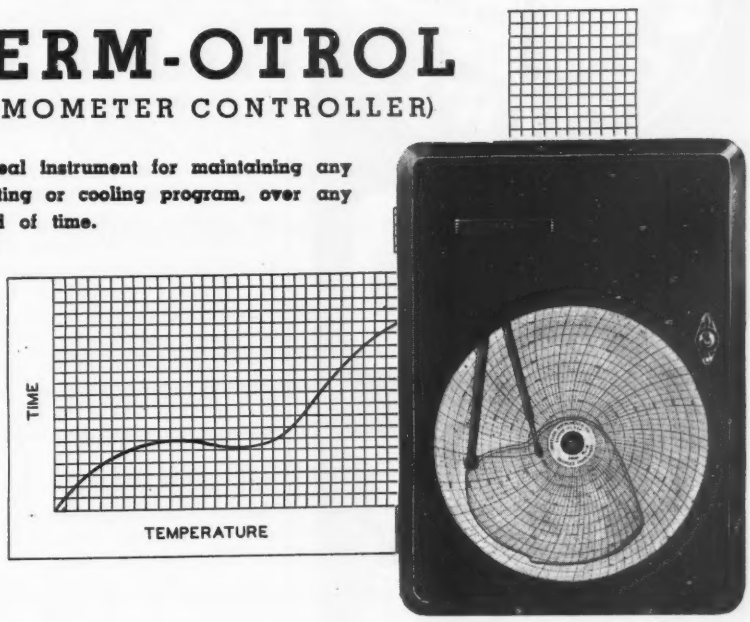
—as the ideal instrument for maintaining any desired heating or cooling program, over any given period of time.



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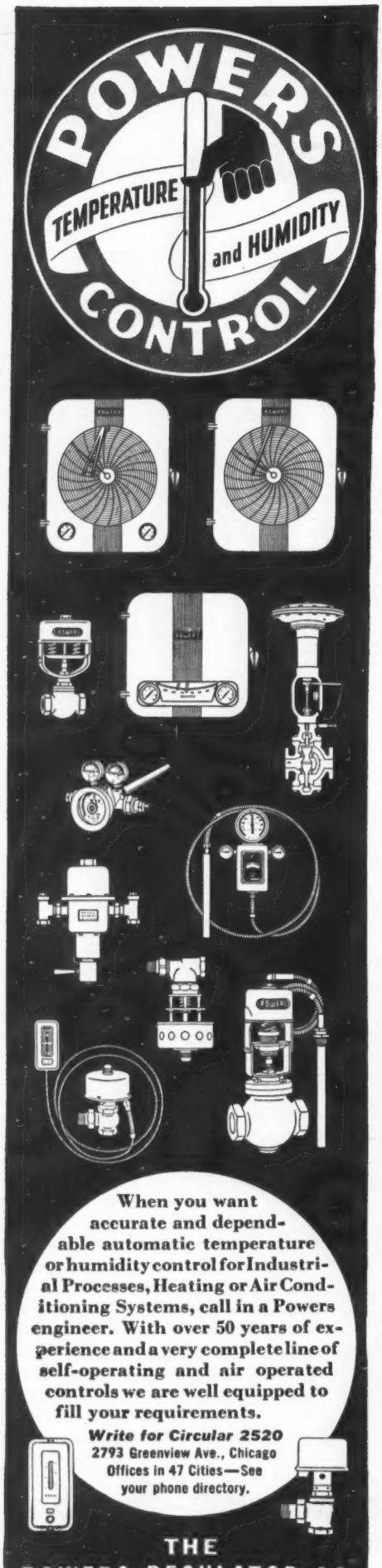
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Food Administration Orders

Shell Eggs, Dried Whole Eggs—FDO 40, released March 22, restricts the sale and storage of shell eggs after May 31, 1943, according to specified quotas, to assure a sufficient supply for military needs. FDO 41, issued March 23, reserves the entire 1943 production of spray-process dried whole eggs for delivery to government agencies. The order also limits production of frozen and liquid eggs, dried yolks, dried albumen and pan-dried whole eggs to the quantities produced and sold for commercial use in the country in 1942.

Fats and Oils—To assure an adequate supply of fats and oils to meet war and essential civilian needs, the Food Administration on March 31 issued FDO 42 limiting manufacturers to the use of fats and oils in a direct percentage to their use of these products in corresponding quarters of 1940 and 1941. If a manufacturer does not use all of his quota during the allotted quarter he may carry the balance forward and add it to his permitted quota for the next quarter.

Fish and Shellfish—On April 1 the Food Administration placed restrictions on the sale of specified canned fish and shellfish, in FDO 44. The order sets quotas for the sale of each canner's pack of salmon, pilchard, sea herring, mackerel, horse mackerel, shrimp, tuna, yellowtail and bonito, and restricts percentages of canned fish that may be packed between April 1, 1943 to Feb. 29, 1944.

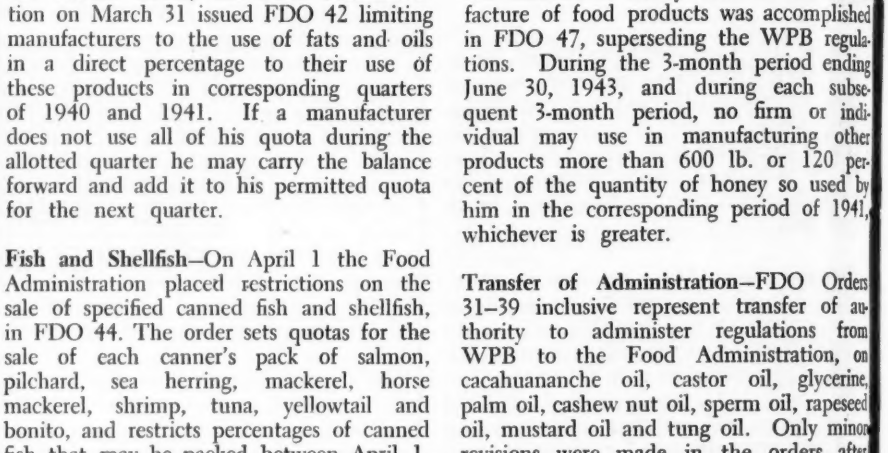
Beans and Peas—Each processor of beans must set aside at least 55 percent of all of his supply during each calendar month for delivery to a government agency, according to FDO 45 issued April 1. Processors and owners of peas and split peas must set aside for government purchase 60 percent of their total supply in each calendar month.

Cocoanut, Babassu and Plam Kernel Oils—Further regulations on the use of these oils went into effect on April 1 when FDO 46 was issued requiring each processor to set aside 25 percent of his total supply for government agencies.

Honey—Transfer of authority to regulate the amount of honey used in the manufacture of food products was accomplished in FDO 47, superseding the WPB regulations. During the 3-month period ending June 30, 1943, and during each subsequent 3-month period, no firm or individual may use in manufacturing other products more than 600 lb. or 120 percent of the quantity of honey so used by him in the corresponding period of 1941, whichever is greater.

Transfer of Administration—FDO Orders 31–39 inclusive represent transfer of authority to administer regulations from WPB to the Food Administration, on cacahuananche oil, castor oil, glycerine, palm oil, cashew nut oil, sperm oil, rapeseed oil, mustard oil and tung oil. Only minor revisions were made in the orders after authority was transferred.

Tea—Quotas for packers and wholesale receivers of tea for the second quarter of



COCA-COLA GETS "E" AWARD

Coca-Cola Co.'s munitions subsidiary, The Brecon Loading Co., Talladega, Ala., which operates the Coosa River ordnance plant, has received the Army-Navy "E" award for excellence in the production of vital war materials. From left to right are Col. T. C. Gerber of the War Department; Lois Turner; W. N. Cochran, vice-president of Coca-Cola Co. and general manager of Brecon Loading Co.; Sarah Wilcox; and Lt.-Comm. E. S. Brown, naval inspector.

1943 were announced on March 24 by the Department of Agriculture. On the same day, FDO 18.2 was amended, making certain changes in computing quotas, to make tea available for distribution to civilian consumers on approximately the same basis as in previous months.

Raisin-variety Grapes—To meet military, civilian and Lend-Lease needs, the Food Administration on April 6 revised FDO 17 to provide that all raisin-variety grapes produced in eight California counties, except those covered by canning contracts approved by the Administration, be diverted into raisins.

Slaughter Permits—The Department of Agriculture on April 2 announced amendment 1 to FDO 27, authorizing U.S.D.A. War Boards to grant slaughter permits and temporary quotas to butchers who do not have 1941 slaughter bases, but are otherwise qualified to receive permits.

Spices—Amendment 1 to FDO 19, issued April 2, establishes new quotas for restricted spices according to the corresponding quarterly period of 1941 or other accepted base period. Restricted spices include black pepper, cassia, cloves, ginger, mace, nutmeg, pimento and white pepper.

Food Directives—The Secretary of Agriculture on March 20 issued the formal directives to OPA to ration meats, edible fats and oils including butter, and cheese, as authorized on March 11. The directive to ration canned fish was issued earlier in the month. Food Directive 6 includes all cheese and fats and oils, although only the hard, cured cheeses and the edible fats and oils previously announced are now rationed. Olive oil and soft cheeses are not rationed. Food Directive 7 applies to meats as listed in the March 11 announcement. Food Directive 5 which relates to rationing processed foods was amended on March 20, and revocation of Food Directive 1 was announced on the same day. On March 17 Food Directive 2 was amended to define more specifically the responsibilities delegated to the Secretary of the Interior in regard to the production of fish and other forms of wild life.

SCHEDULE OF EVENTS

MAY

7– 8—American Society of Brewing Chemists, technical meeting, Hotel Statler, Cleveland, Ohio.

12–14—American Oil Chemists Society, 34th annual meeting, Roosevelt Hotel, New Orleans, La.

12–14—Conference on dehydration of fruits and vegetables, Agricultural Experiment Station, University of Maryland, College Park, Md.

24–25—Flavoring Extract Manufacturers Association of the U. S., Hotel Pennsylvania, New York, N. Y.

25–28—Association of Food and Drug Officials of the U. S., 47th annual meeting, Cosmopolitan Hotel, Denver, Colo.

JUNE

2– 3—National Confectioners' Association conference on wartime problems, Chicago, Ill.

2– 4—Institute of Food Technologists, annual meeting, Hotel Statler, St. Louis, Mo.

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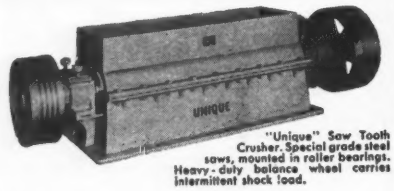

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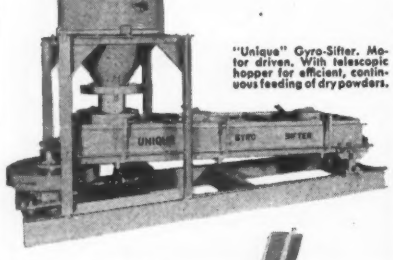

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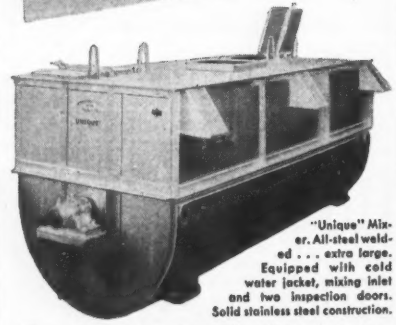

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Chemists Discuss Food Problems

Protecting foods against war gas and effects of hardness in water for canning considered

TECHNICAL information pertinent to the food industries was contained in several papers presented at the meeting of American Chemical Society at Detroit last month. Speaking on the protection of food against chemical attacks, Morris B. Jacobs, of the Department of Health, New York, said that packaging foods with several coverings, such as layers of dense paper, wax paper, cellophane, metal foil and other materials, provides good protection for hours and even days if the seams, edges and corners are intact. Laminated bags with several piles, one of which at least is gas resistant, are also useful. Synthetic rubbers, synthetic resins, metal foils and prepared papers are useful protective materials, if available.

Top floors and basements of warehouses should not be used for the storage of poorly packaged foods. And the product should be stacked in close piles and paulins or sheets of gasproof material should be available for covering.

The effect of heating thiamine solutions and meat containing thiamine in the presence of various concentrations of meat curing ingredients was discussed in a paper by D. A. Greenwood, B. W. Beadle and H. R. Kraybill of American Meat Institute. In experimental studies, a significant loss (19 to 80 percent) of thiamine occurred when a water solution of it was heated in a boiling water bath for one hour in the presence of sodium chloride at 1 to 5 percent concentration. Losses also occurred upon heating in the presence of small quantities of sodium nitrite (0.02 to 0.1 percent). But no loss of thiamine was observed when solutions of the vitamin were heated for one hour in the presence of sodium nitrate or sugars with heating in the presence of common salt, plus the other curing ingredients used in meat, there was no significantly greater loss than when the vitamin was heated in the presence of salt alone. When 2 percent of egg albumen or

TENTATIVE PROGRAM

Meeting of Institute of Food Technologists

Statler Hotel, St. Louis, Mo. • June 2–4, 1943

June 2

PRESIDENT NEWTON PRESIDING

9:45—Call to order, comments and keynote remarks by President Newton.
10:00—General announcements by chairman of local committee.
10:10—Agriculture's part in food economy in wartime.
11:00—The government's part in food economy in wartime.

2:00 P.M.

PRESIDENT NEWTON PRESIDING

1. Types of Food Needed by the Armed Forces, Colonel R. A. Isker, Quartermaster Corps, Subsistence Research Laboratory, Chicago.
2. Food Restriction and National Health, Dr. F. G. Boudreau, Milbank Memorial Fund, N. Y.
3. Vitamin Fortification and the Stability of Vitamins in Foods, Major V. O. Wodicka, Quartermaster Corps, Subsistence Research Laboratory, Chicago.
4. Frozen Foods in War Economy, Clarence Birdseye, Gloucester, Mass.
5. Concentrated Juices, H. S. Bailey, Exchange Orange Products Co., Ontario, Calif.

Evening

Evening meeting and buffet supper.
Nicholas Appert Medal Presentation.

June 3, 1943, 9 A.M.

S. C. PRESCOTT PRESIDING

Symposium on Dehydration of Foods

1. Tray and Tunnel Drying Methods and Equipment, W. B. Van Arsdel, Western Regional Laboratory, Albany, Calif. (awaiting permission from Washington).
2. Spray and Roll Drying Methods and Equipment, C. E. Gray, Golden State Co., Ltd., San Francisco.
3. Plant Problems in the Dehydration of Vegetables and Fruit, R. V. Tobin, Beech-Nut Packing Co., Rochester, N. Y.
4. Dehydration of Eggs, H. E. Goresline, Bureau of Agricultural and Industrial Chemistry, Washington, D. C.
5. Dehydration of Meats, H. R. Kraybill, American Meat Institute, Chicago.

2:00 P.M.

L. V. BURTON PRESIDING

Symposium on Containers and Packages

1. Container Situation as Affected by General War Situation.
2. Containers for Heat Processed Foods, C. O. Balls, Owens-Illinois Can Co., Toledo, Ohio.
3. Fiber and Export Food Containers, Major James d'A. Clark, Quartermaster Corps, Subsistence Research Laboratory, Chicago.
4. Dehydrated Food Compression, B. E. Proctor, Massachusetts Institute of Technology, Cambridge, Mass, and J. C. Sluder.

4:15 P.M.

Business session.

Evening

Municipal Opera for opening night of "Balalaika," St. Louis Municipal Theater.

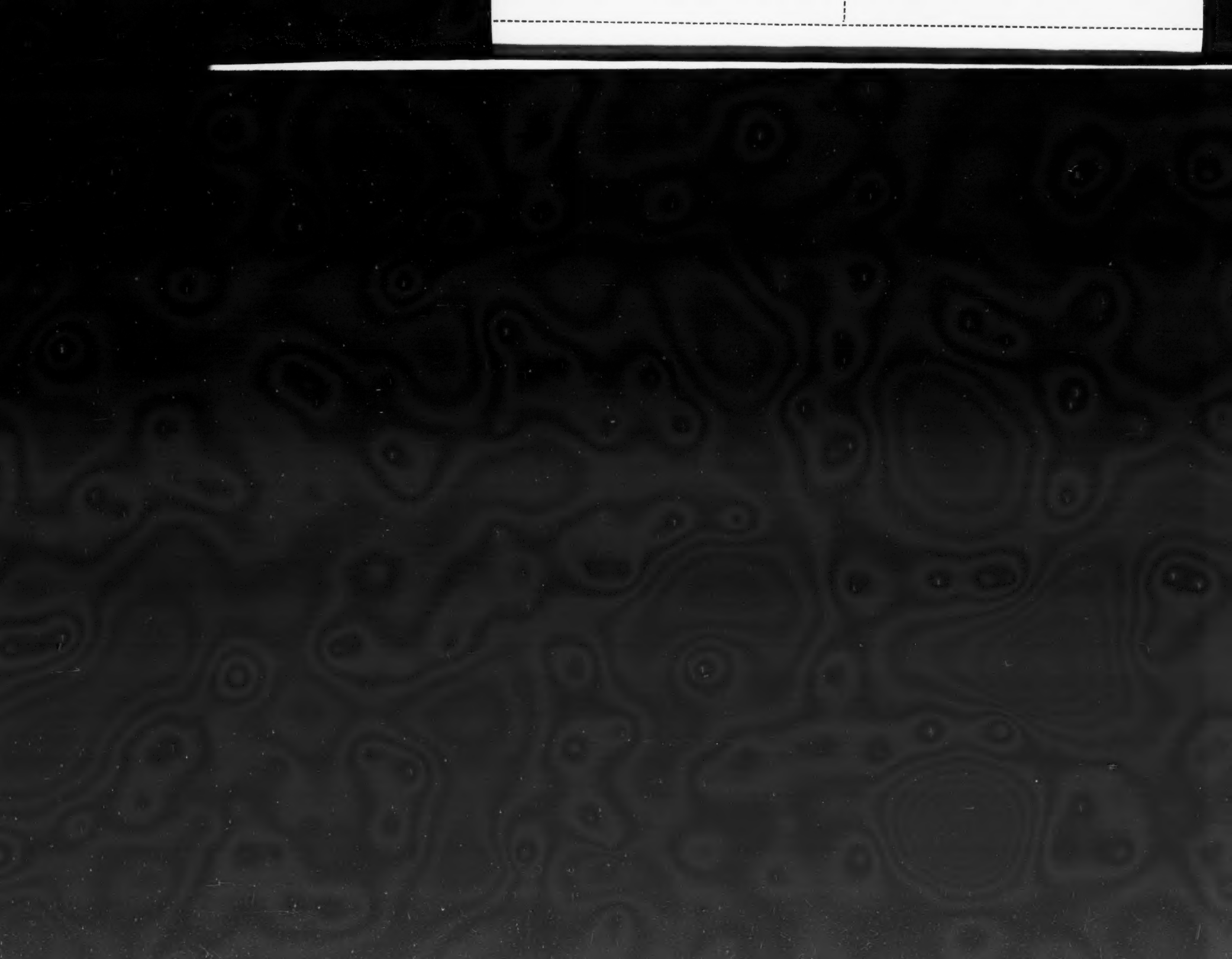
June 4, 1943, 9:00 A.M.

PRESIDENT NEWTON PRESIDING

1. Special Army talk, by Col. Lawrence H. Whiting, Consultant to the Secretary of War.
2. Dehydration of Dried Fruits and Vegetables, L. B. Howard, Western Regional Research Laboratory, Albany, Calif. (awaiting permission from Washington office).
3. Moisture Determination in Dehydrated Foods, Benjamin Makower, Western Regional Research Laboratory, Albany, Calif. (awaiting permission from Washington office).
4. Control of Fat Deterioration, G. E. Holm, Bureau of Dairy Industry, Washington, D. C.
5. Control of Enzymatic Actions in Foods, A. K. Balls, U. S. Bureau of Agricultural Chemistry and Engineering, Washington, D. C.

2:00 P.M.

Submitted research papers to be presented before subsections as the type and number of papers indicate. These papers will be grouped under subsection A, subsection B and subsection C.



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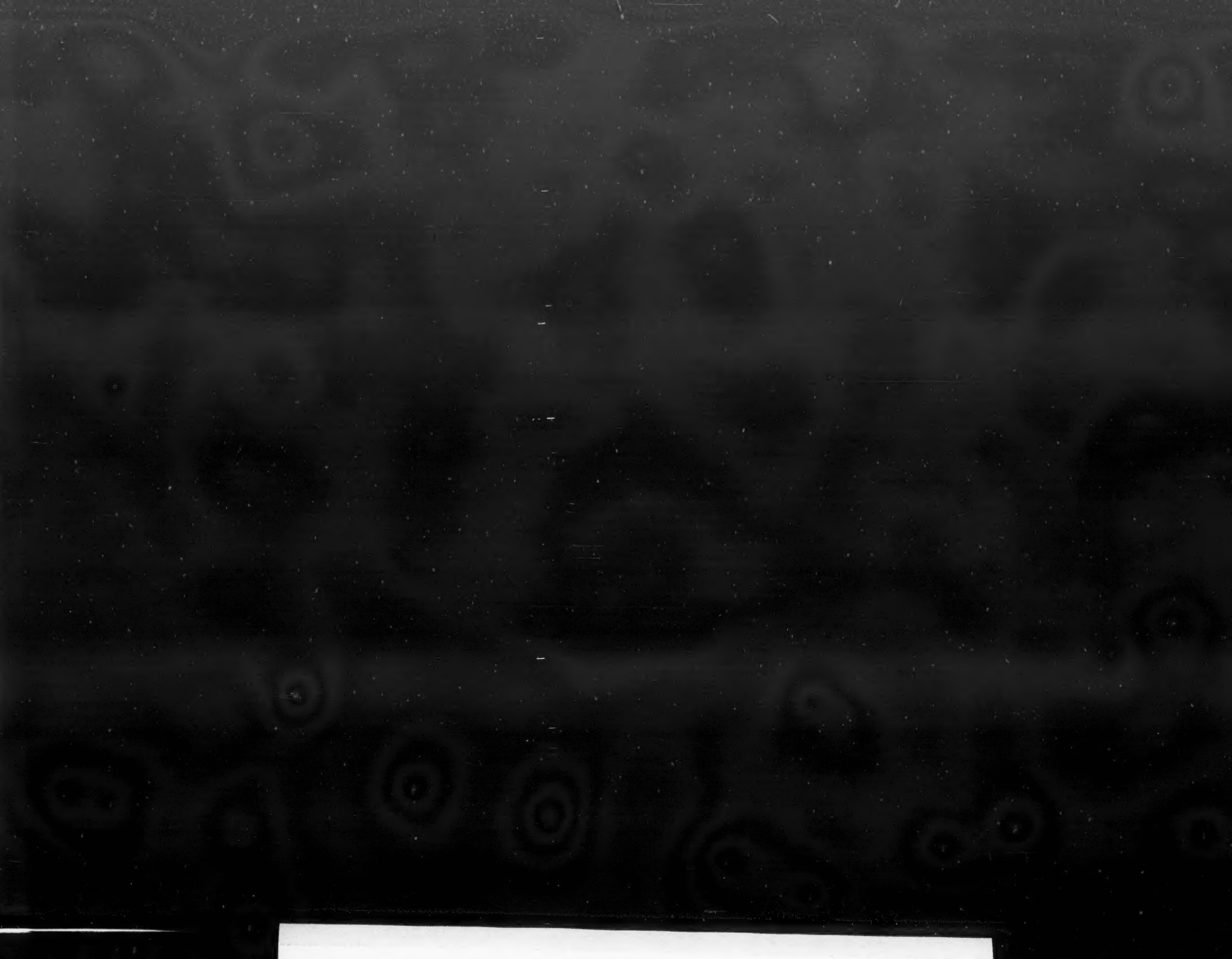

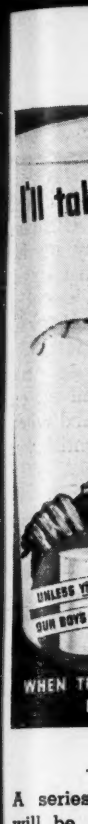

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If you'll take care of the FOOD!
UNLESS YOU PACK IT OUR BOYS CAN'T EAT IT
WHEN THE CANNING CROPS ARE READY BE PREPARED TO DO YOUR SHARE

APPEAL FOR MANPOWER

A series of colorful lithographed posters will be used by canners in recruiting the help needed to harvest and pack this season's crops of fruits and vegetables. Like the one illustrated here, they carry the slogan: "When the canning crops are ready, be prepared to do your share!" These posters have been lithographed at cost by Stecher-Traung Lithograph Corp., Rochester, N. Y. Federal Advertising Agency, New York, furnished the artwork and copy at cost.

gelatine was contained in the curing solution there was a significant decrease in the loss of the vitamin.

Chemists are making rapid progress with new processes for producing highly specialized fats, according to Dr. H. W. Vahlteich, of Best Foods, Inc. They are learning how to separate soybean oil into various fractions, some of which are suitable to replace linseed oil and others to replace cottonseed oil. They have also learned how to juggle the fat molecules around so as to produce entirely new fats from processing combinations of already well-known oils.

Water Problems

In canning certain vegetables, the use of water of excessive hardness, particularly calcium hardness, is undesirable because of the hardening or toughening effect, according to C. A. Greenleaf, of National Canners Association. On the other hand, a high residue of alkali bicarbonate resulting from softening may impart an insipid flavor or injure the texture and appearance of the product.

Corrosive action by water may be due either to acidity or excessive alkalinity. The former may be remedied by an increase of pH, while sodium chromate has been found useful in overcoming alkaline corrosion.

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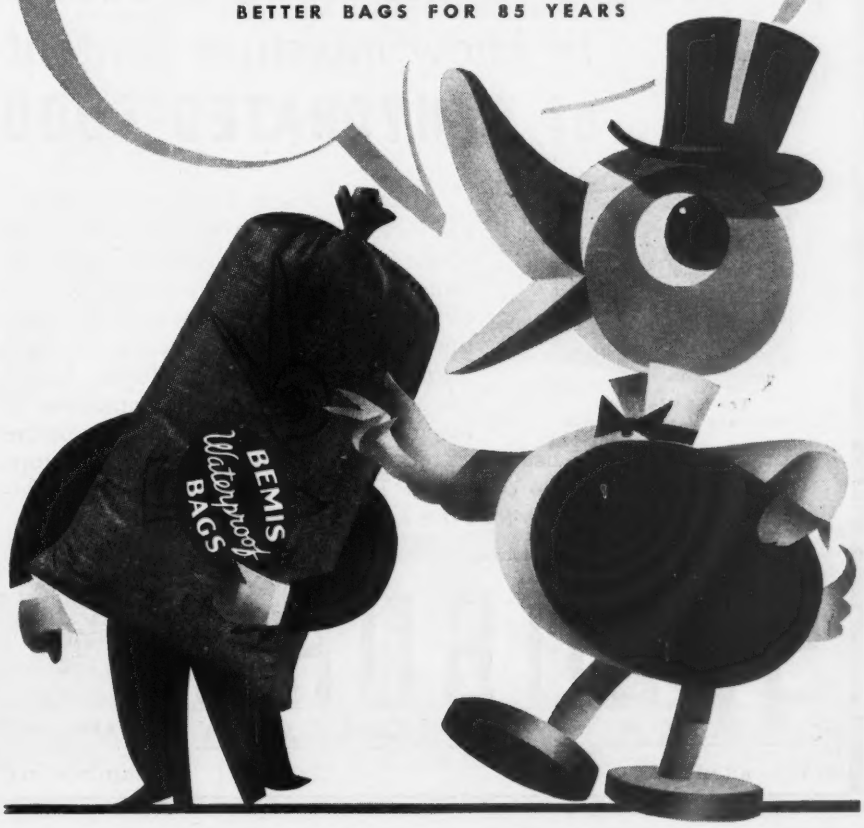

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Nutmeg — **Allspice**
Mace — **Cardamon**
Ginger — **Soluble Black Pepper**

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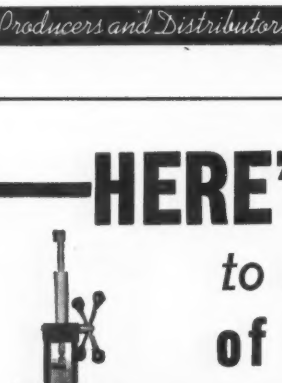

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WPB Orders

Telephone Service—WPB Order U-2, issued on March 25 by the Office of War Utilities, orders that telephone service may be installed for "producers of substantial quantities of food where such service is essential to such producers' operations." Previous limitations on extensions in many instances denied telephone service to such customers. All new telephone installations will be on interim basis subject to removal if and when the equipment is required for essential war purposes.

Automotive Parts—Automotive replacement parts and automotive maintenance equipment have been removed from the list of items to the purchase of which preference ratings may be applied. Also excluded from preference ratings under the Controlled Materials Plan are cellophane and similar materials derived from cellulose having a gage of less than 0.003 in. and cellulose caps or bands of any gage.

Textile Bags—Restrictions of M-221, which permitted the use of only standard sizes of textile bags and shipping sacks for storage or shipment of certain commodities, were removed on March 30 for a group of commodities including nuts, animal feed, flour, starch and sugar. For the revised list of commodities still covered by the order, restrictions were placed on manufacturers of textile bags and paper shipping sacks instead of on the users of such bags.

Riboflavin—A shortage of riboflavin for defense needs resulted in M-299, issued on March 31, placing the vitamin source under allocation. The order covers both crude and refined forms of riboflavin but does not include standard dosage forms or combinations in feeds, foods and beverages or riboflavin concentrates of natural origin, and excepts from allocation control the use by any person of not more than five grams a month.

General Imports—Order M-63 on General Imports was amended by WPB on April 2, placing sardines and tuna fish packed in oil under control of List III of the order, which restricts importations except of products from Canada, Mexico, Guatemala or El Salvador which come by rail, air or inland waterway, but does not regulate distribution. Pickled or salted cod, haddock, hake, polluck and cusk were also added to List III. Peanuts, shelled and unshelled, were added to List I, which controls the processing and distribution of authorized imports. Dried milk products, including whole and skimmed milk, buttermilk and cream, were placed on List III, making them subject to the same control as condensed and evaporated milk.

Malt and Malt Sirup—To conserve malt for the manufacture of industrial alcohol, the use of malt and malt sirup by large brewers is reduced 7 percent below 1942 consumption in Order M-288, issued on March 1. Small brewers are prohibited from using more of such products than they used in 1942.

Davis Still Without Power

Has been granted no additional authority that would enable him to solve food problems

AT MID-APRIL there was still no indication that Chester Davis had received a grant of power that would enable him to do anything to improve the food situation. The executive order establishing him as the new food administrator gave Mr. Davis slightly less power in handling foods than had been given to Secretary Wickard. Since that time there has been no official or unofficial indication if or when the needed additional powers will be forthcoming.

Some Washington observers believe that the political considerations surrounding the Bankhead and Pace bills are the cause for the delay. Those holding this view point out that it would be a tactical blunder to formulate a policy prior to the clarification of the political and legislative issues which in their final settlement might force a change in the program almost as soon as it was announced.

Food processors have been encouraged in the last month by the expressions of topside WPB officials that Mr. Davis will receive all the materials and other assistance necessary to solve the food problem which they feel is today's No. 1 national problem. This lip service to the cause of food may sound well to the members of the industry out in the hinterland, but in Washington it means nothing unless means are provided to put the ideas and policies into effect. So far, nothing has been done in this direction. Food processors are having and will probably continue to have as much trouble as ever getting new equipment and supplies necessary to carry on their business.

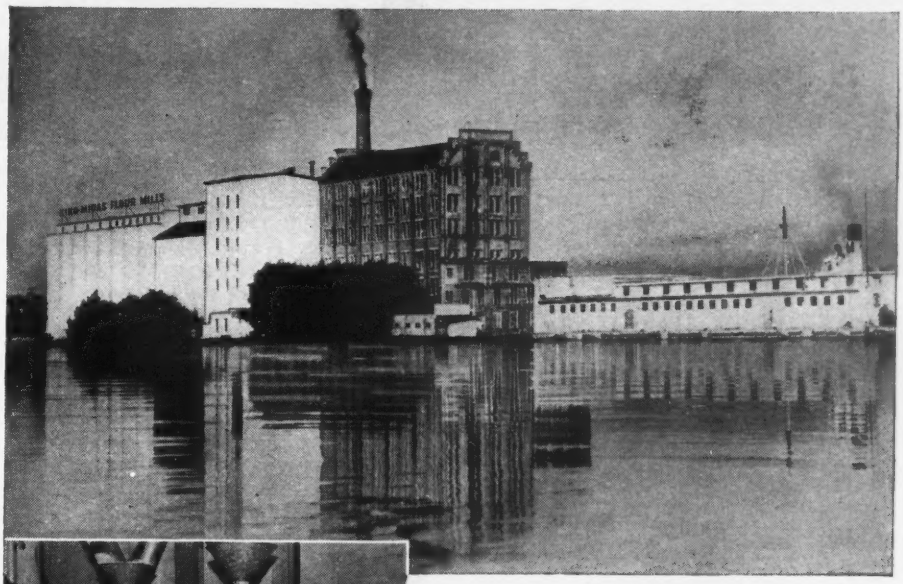
BAIC Work Transferred

PRACTICALLY all experimental work of the Bureau of Agricultural and Industrial Chemistry has been moved out of Washington. Between 60 and 70 members of the staff formerly engaged in this type of activity at the headquarters of the Department of Agriculture have been transferred to the four Regional Laboratories, leaving a small skeleton staff in Washington.

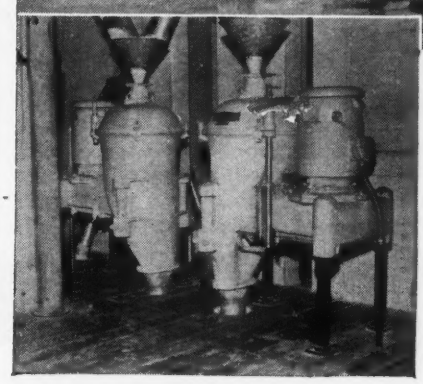
War Food Conference Set

FOOD MANUFACTURERS will meet June 9-10, in New York, to consider solutions for problems brought about by serious wartime food shortages. To be held by Grocery Manufacturers of America, the war conference will pay

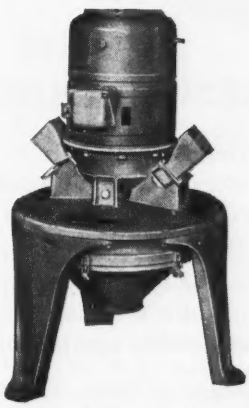
LEADING MILL PROTECTS ITS PRODUCTS



Waterfront view of the big Superior, Wis., plant of King Midas Mill where "ENTOLETERS" are in use.



This pair of "ENTOLETERS" are early models, but they still give 100% service in the King Midas Superior Mill.



"ENTOLETER" shown above handles 15,000 lbs. per hr. Also in sizes to handle 2,000, 5,000 or 10,000 lbs. per hr.

Proved Method Stops Insect Infestation

King Midas Mill Company, one of the world's largest manufacturers of Durum products, was among the first users of the "ENTOLETER" Infestation Destroyer. This progressive company now has "ENTOLETERS" in regular service in both its Superior, Wis., and Hastings, Minn., plants.

Proof of "ENTOLETER'S" 100% efficiency is in its use. Its mechanical action completely destroys all forms of infestation in flour, cereals, spices, granulated, powdered or similar dry materials INCLUDING DEHYDRATED PRODUCTS.

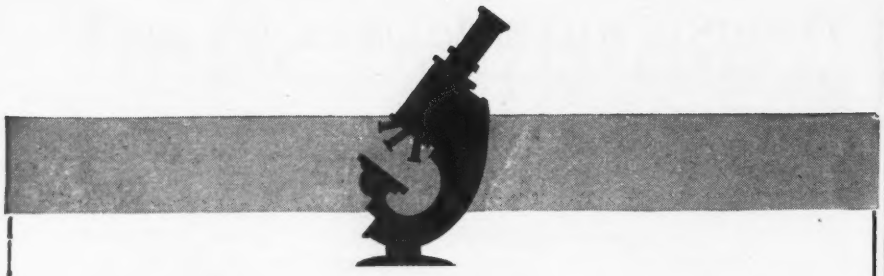
Inexpensive, easy to install and operate. Extremely low maintenance. ENTOLETER DIVISION, The Safety Car Heating and Lighting Company, Inc., 230 Park Avenue, New York, N. Y.

ENTOLETER

INFESTATION DESTROYER

REG. U. S. PAT. OFF.

CONTINUOUS DESTRUCTION OF ALL INSECT LIFE



AVAILABLE TO FOOD EXECUTIVES

A new brochure, "Science at Your Service", has been prepared for executives, plant managers, technologists and others in the food field.

War times present many new problems. New ingredients, new formulas, new processes, new packaging—vitamin retention, enrichment and control.

This brochure describes the facilities of our organization in helping you meet these problems. A copy will be sent upon request.

FOOD RESEARCH LABORATORIES, INC.
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Over 20 years' service to industry

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When experienced help is scarce, the use of a thoroughly dependable cleaner is a "must". Metso is your trustworthy cleaner for removing all grease, oil and solid matter. In addition, it aids in preserving your irreplaceable equipment.

This safety feature of Metso is due to its unique silica (SiO_2) content which balances the cleaning action, protecting against chemical attack. Put Metso to work in your plant.

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Sold in Canada by National Silicates, Ltd. • Distributors in over 60 Cities

METSO CLEANERS

particular attention to the manpower problem. According to Paul S. Willis, president of GMA, by June there will be such an acute shortage of men in the entire food industry that it is doubtful if the manufacturers can handle this year's pack.

Bakers Allowed More Shortening by OPA

OPA's recent about-face on the allotment of fats for bakery products gave bakers their first easy moments since the original rationing announcement. Fats will now be allotted for bakery products this quarter—April, May and June—in an amount equal to consumption during the corresponding quarter of 1942, and bakers can use their present quarterly allotment at the same rate as last year. OPA's dictum early this year restricting the use of fats in bakery products and its simultaneous desire for increased production of baked goods to offset shortages found that government agency hoist by its own petard. To make possible the new allocation, which represents an increase from the 70 percent ration granted originally, OPA will make additional ration points available to bakers prior to June 1 for use during that month.

Soup Mix Men Form Trade Association

RAPIDLY INCREASING sales of dry and dehydrated soups and consequent production problems have resulted in a new trade association, The Soup Mix Manufacturers, formed recently with L. J. Gumpert, B. T. Babbitt, Inc., as chairman of the group. Mr. Gumpert said that the sale of soup mixes had skyrocketed from $300,000 in 1939 to an estimated $40,000,000 in 1943. Two of the most pressing problems facing the manufacturers are raw material shortages and rationing. A Committee on Raw Materials and a Committee on Rationing, as well as an Executive Committee were named at the organization's first meeting, at which time Robert Smallwood, president of Thomas J. Lipton, Inc., was named vice-chairman and Robert Brenner of Aunt Polly Soup Mix was elected secretary-treasurer.

Snider Opens New Research Laboratory

THE new research laboratory of Snider Packing Corp. at Albion, N. Y., was opened with appropriate ceremonies on April 12. Facilities include well-equipped chemical and bacteriological laboratories and a complete independent

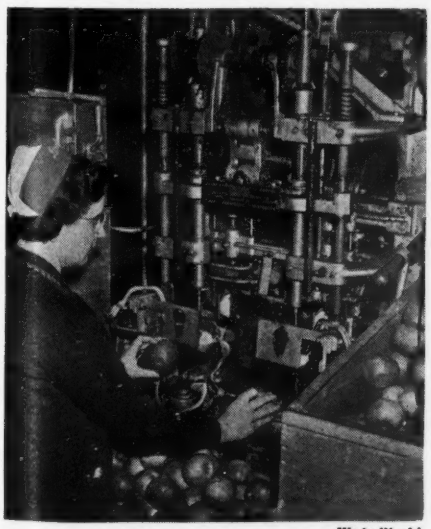
pilot plant in a beautiful building that was formerly a fine old colonial residence. Green houses are yet to be built on the grounds to permit horticultural research. The laboratory is about a block west of Snider's Albion plant.

Harold J. Humphrey, vice-president in charge of research and frozen food operations, and formerly superintendent of the Albion plant, continues to make his headquarters in the main office in Rochester, N. Y. Dr. Kenneth G. Dykstra is in direct charge of the laboratories. Dr. Walter D. Enzie, formerly of the New York State Agricultural Experiment Station, who heads up the horticultural research, joined the organization on April 12.

Develops Plan To End Bad Situation in Meat

MEAT PACKERS, livestock producers and meat marketers have formed a Livestock and Meat Council which will endeavor to work out a solution to the wartime meat problem. The Council has sent a committee to Washington in an effort to have put into operation quickly a comprehensive, businesslike program designed to correct the acutely chaotic conditions surrounding the national meat supply.

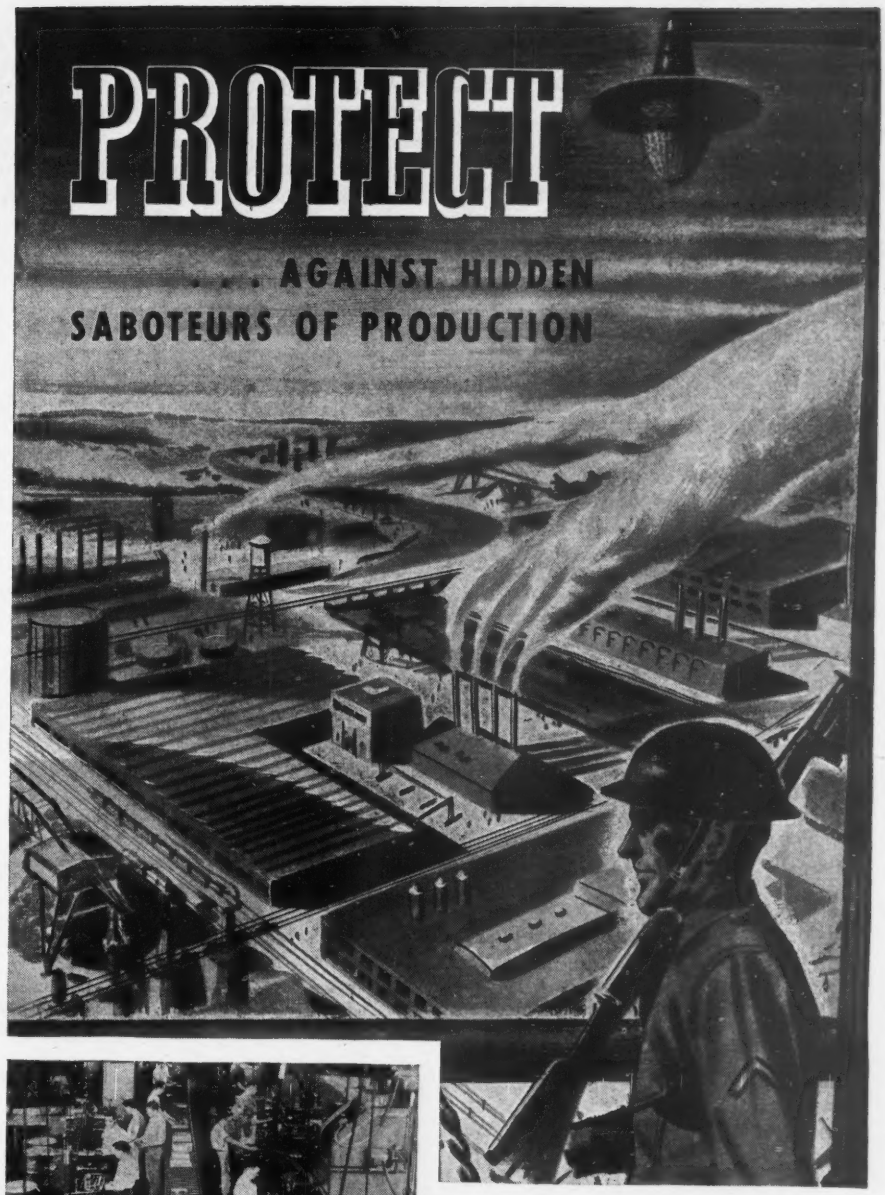
The basic principles of the proposed program include encouragement of livestock production, adequate control of livestock slaughter, keeping the demand in balance with the supply, an overall government meat management administration, and an educational program to enlist public understanding and support.



Wide World

PEELS APPLES FOR ARMY

At the plant of Deerfield Packing Co., Bridgeton, N. J., where apples are dehydrated for the armed forces, the fruit is peeled at high speed and with a minimum of waste by this machine. It also cores the fruit.



ASK the men in charge of operations on the working front . . . these men know the value and importance of Standard Conveyors in guarding against many hidden "saboteurs" of production—the congestion of working areas, the delay in getting materials and parts from one department to another—the loss of valuable man-hours in needless fetch-and-carry operations.

In foundries, munitions plants, steel and brass mills, aviation machine shops and scores of other plants, Standard Conveyors are helping to maintain the swift tempo of wartime production.

If you are producing war material or other products regarded as necessary to the war effort, Standard Conveyors are available for your handling needs. Write for full information and a copy of the booklet, "Conveyors by Standard," FI-5.

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General Offices: NORTH ST. PAUL, MINN.
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★ ENGINEERED FOR FASTER PRODUCTION ★

Sub Detector To Locate Large Schools of Fish

FISHERMEN in British Columbia waters may soon seek their catch by sound. This method of locating large schools of fish has proven effective in Norwegian waters, it is reported, and it is to be tried out in the B. C. herring fisheries. British Columbia Packers, Ltd., is fitting a 45-ft. boat with an echo sounding device at a cost of $4,000 to $5,000. Originally devised to aid ships in shallow waters, this echo sounder has been developed until it will record a "whisper." The sound will echo back from a large mass of fish and the distance will be recorded on a chart.

U. S. Grading of Lamb and Mutton Ordered

COMPULSORY GOVERNMENT grading of all lamb and mutton carcasses sold by packers and wholesalers was ordered on April 10 by OPA as part of its program of control over the prices of these meats. The amendment 3 to MPR 239 is in line with OPA's previously announced intention to tie price to quality wherever necessary to protect ceilings, and also changes the original regulation in other ways to bring it more nearly in line with the trade practices in the marketing of lamb and mutton.

When MPR 239 was originally issued, OPA recognized that government grading was desirable in the interests of price enforcement, but when the order was issued there was insufficient trained personnel available to handle the job. Since then the Department has expanded its staff to assume the task.

Federal Stamp on Meat Required by New York

All carcasses of animals to be sold for consumption as meat in New York City must bear the Federal imprint or stamp showing the identity of the slaughterer, as required by the U. S. Department of Agriculture. This is the provision of an amendment made in April to the New York City Sanitary Code.

This action was taken at the request of the U. S. Department of Agriculutre as a cooperative step in efforts to wipe out the black market sale of meat in New York City.

Price Index Edges Up

Although the change was much less rapid than in former months, commodity prices continued to edge upward in the period from mid-March to mid-April. The general weekly commodity price index of the *New York Journal of Commerce*, which stood at 108.2 on March 13, 1943, had risen to 108.5 by April 10th. For the same four weeks, that publication's food commodity index rose from 113.5 to 114.4, while its grain index fell from 109.2 to 108.9.

Spot prices of food commodities showed few changes during the same four weeks, as most were steady under ceilings. Wheat, No. 2 hard winter, Kansas City, increased from $1.36½ to $1.37¾. Corn, No. 3 yellow, Chicago, rose from $0.99 to $1.00. In contrast, flour fell from $7.20 to $7.00

CONSTRUCTION NEWS

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1943 (thousands)
Bakery	$50	.....	.....
Beverages	.....	.....	.....
Canning and Preserving	211	.....	$75
Cold Storage Plants	.....	$40	40
Confectionery	.....	.....	.....
Grain Mill Products	80	442	557
Ice Manufactured	.....	.....	40
Meats and Meat-Products	40	.....	125
Milk Products	270	80	160
Miscellaneous	499	40	1,280
	$1,150	$602	$2,277

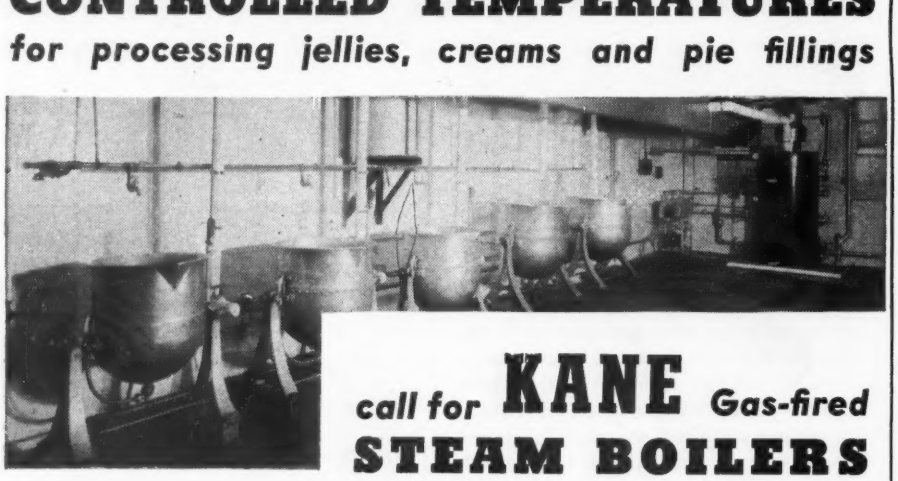
Feed Supplies Govern 1944 Food Supplies

With between 10 and 15 percent more livestock on American farms in 1943 than last year, the abundant supplies of feedstuffs from the 1942 harvest have been disappearing at an unusually high rate. While this situation is not likely to affect food supplies in 1943, it does threaten the 1944 food supply. Unless production of grain and protein feeds is larger this year than it was last year, it may be difficult to keep livestock numbers at the desired level.

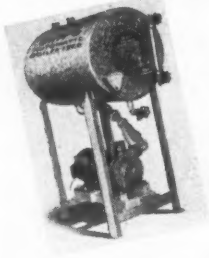
Reports of intentions to plant, as given in the April report of the Crop Reporting Board, indicate that, provided the growing weather is suitable and sufficient manpower is available, this goal may be reached. Acreage to be planted to corn is set at 97,000,000 acres, an increase of 6,000,000 acres over 1942. Oats and other small grains, also hay, are expected to equal 1942 plantings. Soybean plantings are forecast as greater than last year, as are flaxseed plantings. Supplies of cottonseed are not yet predictable.

The low spots in the outlook appear to be in peanuts, sugarbeets and wheat, all of which are expected to be less abundant in 1944 than they were in 1943.

CONTROLLED TEMPERATURES
for processing jellies, creams and pie fillings



call for* KANE *Gas-fired
STEAM BOILERS



For any process requiring precise temperature control and maximum cleanliness, the steam-generating combination shown above is hard to beat. The Kane Automatic Gas-Fired Boiler and M-K-O Boiler Feed and Condensate Return System provide a practically fool-proof source of process steam . . . at remarkably even pressure . . . with minimum attention . . . and minimum fuel consumption. Kane Boilers embody many features and are made in sizes from 1 to 30 H.P. Processors of essential foods should have no difficulty in securing required priority for needed boiler equipment.

M-K-O Boiler Feed & Condensate Return System *automatically* returns hot condensate . . . adds needed make-up water to maintain proper level for most efficient boiler operation.

MEARS-KANE-OFEIDT
Manufacturers of Automatic Steam Boilers for over a third of a century.
1903-1915 EAST HAGERT STREET, PHILADELPHIA

INDICATORS

Flour production in March, 1943, as reported by *The Northwestern Miller* for mills producing 65 percent of United States output, totaled 7,200,367 bbl., compared to 5,588,470 bbl. for the corresponding month last year.

Wheat, winter, to be produced in 1943 was estimated by the crop reporting board on April 1st at 558,551,000 bu., the smallest yield in seven years and 145,000,000 bu. below last year's crop.

Wine consumption in 1942 is estimated at 112,000,000 gal., an all-time high.

Sardine catch, 1942-1943 season, final figures, totaled 1,002,576,000 lb., compared to 1,242,008,000 lb. in the preceding season.

Green and wax beans canned in 1942, according to a recent report of National Canners Association, totaled 23,790,346 standard cases, compared to 12,494,319 cases in 1941.

Cabbage acreage, total, planned for 1943 is reported at 171,850 acres, compared to 184,420 acres harvested in 1942.

Sweet corn acreage for processing expected to be planted this year, according to a USDA report for late March, totaled 542,430 acres, compared to 517,000 planted in 1942.

Snap bean acreage for processing expected to be planted this year, according to a USDA report for late March, totaled 165,240 acres, compared to 138,400 acres planted in 1942.

Milk production on farms in February, 1943, was 1 percent larger than in February, 1942, while milk production per cow was approximately the same.

Evaporated milk production in February, 1943, was 207,192,000 lb., compared to 300,003,000 lb. in February, 1942. This figure was 40 percent over the 1937-1941 average February production.

Condensed milk, all kinds, produced in February, 1943, totaled 57,258,000 lb., compared to 50,712,000 lb. in February, 1942.

Whole milk, dried, produced in February, 1943, was 7,850,000 lb., compared to 2,175,000 lb. in February, 1942, and was 416 percent over the 1937-1941 February average.

Skim milk, dried, produced in February, 1943, totaled 31,900,000 lb., compared to 41,810,000 lb. produced in February, 1942, and was 3 percent above the 1937-1941 average February production.

Oleomargarine sales in February, 1943, as indicated by sales of internal revenue stamps, totaled 53,501,740 lb., 66 percent over sales in February, 1942.

Chicks hatched in February, 1943, totaled 12,927,000. This was a new record for February and was 24 percent above the previous high for the month, recorded a year before.

Butter, creamery, produced in February, 1943, totaled 121,995,000 lb., compared to 118,020,000 lb. in February, 1942, and to a 1932-1941 February average of 116,575,000 pounds.

Cheese, American, produced in February was 46,995,000 lb., 24.9 percent below production a year earlier, but 68.9 percent over the 1932-1941 average February output.

Beans, dry edible, are expected to be grown on 2,480,000 acres in 1943, an increase of 16.2 percent over the acreage planted in 1942.

Potato acreage expected for this year is 3,174,000 acres, up about 14 percent from that planted a year ago.

Confectionary and competitive chocolate products sales in February, 1943, totaled $33,925,000, exclusive of Army ration bar sales, for the 215 firms reporting to the Department of Commerce. This was 19 percent more than in February, 1942.

Fruits, frozen, in storage on March 1, 1943, totaled 145,022,000 lb., compared to 142,192,00 lb. on March 1, 1942, and to a 1938-1942 average of 115,180,000 lb. for the date.

Vegetables, frozen, in storage on March 1, 1943, were 75,454,000 lb., compared to 73,245,000 lb. a year before.

Butter, creamery, in storage on March 1, 1943, totaled 12,321,000 lb., compared to 63,701,000 lb. on March 1, 1942, and to an average of 42,495,000 lb. for the date in 1938-1942.

Cheese, all kinds, in storage on March 1, 1943, was 94,532,000 lb. A year earlier the figure was 160,073,000 lb., and the 1938-1942 average for the date was 107,929,000 pounds.

Eggs, case equivalent, in storage on March 1, 1943, amounted to 2,466,000 cases, compared to 2,496,000 cases on March 1, 1942, and to an average in 1938-1942 of 1,821,000 cases for the date.

Poultry, all kinds, in frozen storage on March 1, 1943, totaled 101,697,000 lb., compared to 179,083,000 lb. a year before and to an average in 1938-1942 of 140,778,000 lb. for the date.

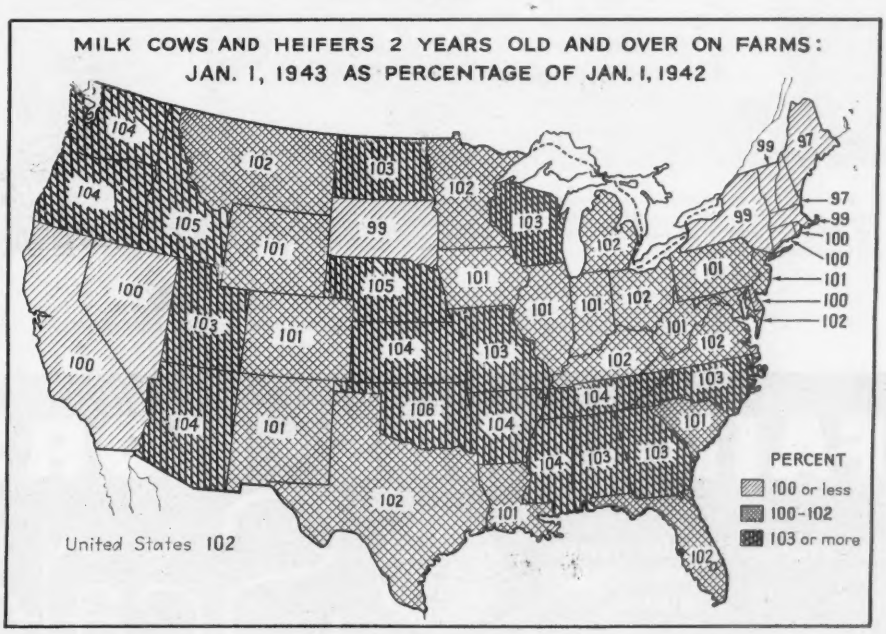
Meat, frozen, cured, and in cure, in storage on March 1, 1943, was 833,733,000 lb., compared to 891,161,000 lb. on March 1, 1942, and to an average in 1938-1942 of 818,281,000 lb. for the date.

Lard in storage on March 1, 1942, was 116,262,000 lb., and rendered pork fat on the same date totaled 7,451,000 lb. The figures for the two products a year earlier were 201,900,000 lb. and 4,665,000 lb. The combined average for these products in 1938-1942 was 206,421,000 lb. for the same date.

Weekly food price index of Dun & Bradstreet on April 3, 1942, stood at $4.10. This was 1¢ below the 22-year high recorded on March 20, but was 47¢ above the $3.63 recorded for the corresponding April date last year.

Business activity index of *Business Week* stood at 203.2 on April 10, 1943, compared to 200.3 a month before and to 177.2 on the corresponding 1942 date.

Cost of living index of National Industrial Conference Board for March, 1943, stood at 102.8, compared to 101.8 in February and 96.1 in March, 1942.


MILK COWS AND HEIFERS 2 YEARS OLD AND OVER ON FARMS:
JAN. 1, 1943 AS PERCENTAGE OF JAN. 1, 1942
United States 102
PERCENT
100 or less
100-102
103 or more

GOOD?

They have to be to get where they are!

In good light or bad . . . operated by experienced weighmen or novices . . . weighing all kinds of commodities . . . Fairbanks Printomatic Scales have proved to the world that they have what it takes! They eliminate human errors, speed up weighing operations, and provide a PRINTED record showing what was weighed, who weighed it, and when.

Fairbanks Scales have proved their reliability through their 113 years of service. Each part, carefully designed for its specific function and built with precision, guarantees your incoming, outgoing, and processing weight operations.

The Printomatic records the correct weight automatically, prints it on a roll tape, weigh ticket, or combination of both, or on gummed tickets. Adaptation of Fairbanks Printomatic Scales to weighing problems, simple or complicated, is practically unlimited. Why not investigate what these scales can do for you? Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

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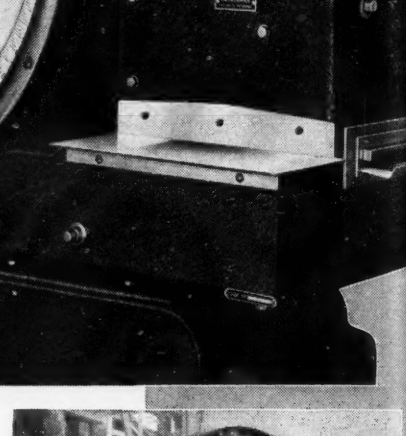
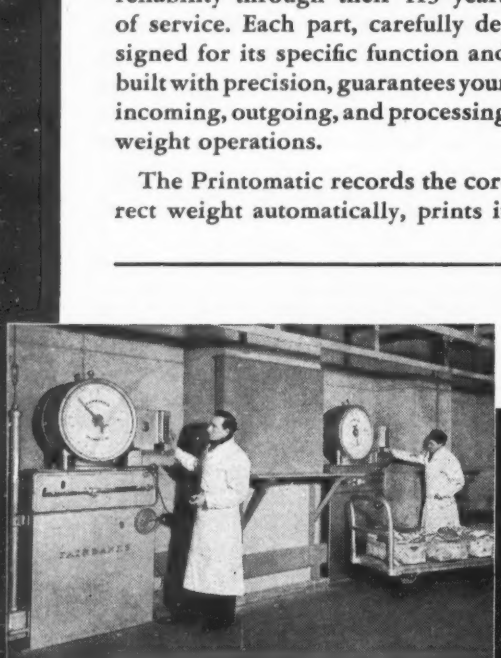
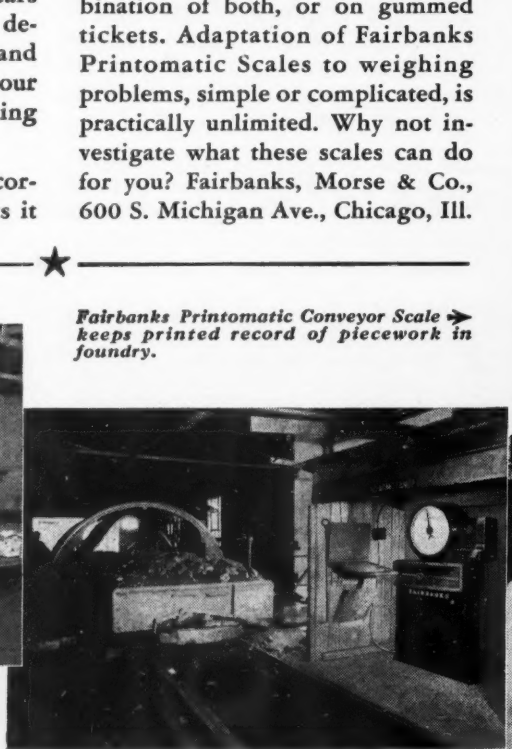


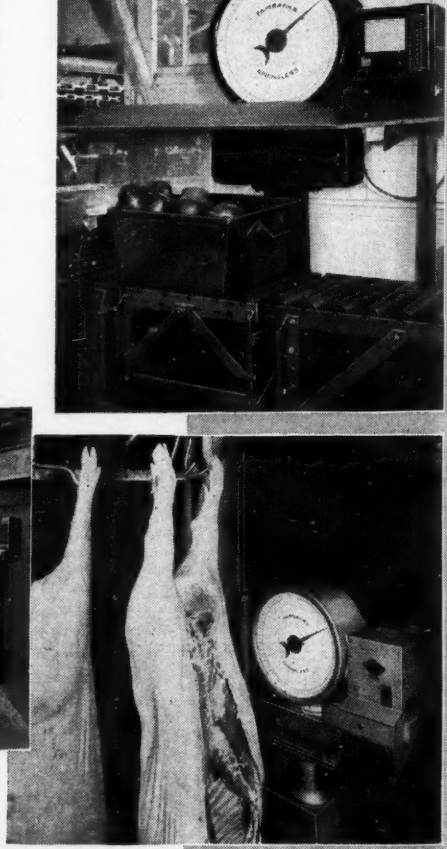
Fairbanks Printomatic Conveyor Scale → keeps printed record of piecework in foundry.



↑ Fairbanks Printomatics recording meat shipments to retailers. Each of 221 different kinds of meat is given a designating number.



↑ Fairbanks Coal Mine Car Scale with Printomatic weighs mine cars in motion, protecting employer and miner.



Fairbanks Portable Dial → Scale with Printomatic weighing and printing records of meat to retailers.

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RAILROAD EQUIPMENT

FAIRBANKS SCALES

Scales

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INDUSTRY

American Dietaids Co., Yonkers, N. Y., has purchased a former Standard Oil Co.'s plant in Middletown, N. Y., and plans to dehydrate $4,000,000 worth of food annually.

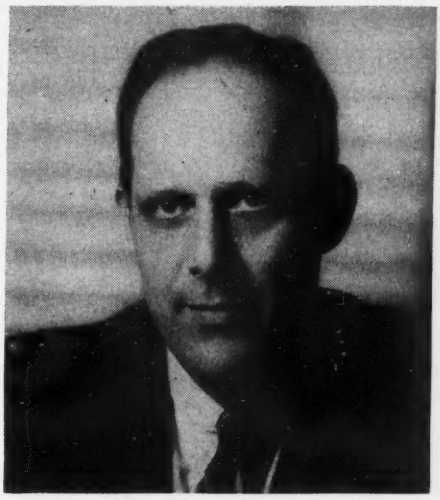
American Home Products Corp., Jersey City, N. J., is negotiating to acquire G. Washington Coffee Refining Co., manufacturer of instant coffee. Completion of this deal will be the company's second expansion step in 1943.

American Macaroni Co., Birmingham, Ala., a newly formed organization, has taken over the American Macaroni Manufacturing Co., which has a daily production capacity of 50,000 packages of macaroni and spaghetti.

Armour & Co., Chicago, Ill., is distributing a large wall chart, 62x42 in., showing the ration point value for all meats and foods requiring red ration stamps. The chart is big enough so that customers as well as clerks can read the points easily.

Detroit Rendering Co., Detroit, Mich., has painted spectacular signs on one of its trailer-trucks to promote the collection of household fats. One sign reads—"Shell Out Your Fats and Blast Out the Rats."

General Mills, Inc., Minneapolis, Minn., has published an 19-page booklet, "War-Work—A Daybook for the Home," pointing out what can be done in the home to contribute to the war effort.



RAYMOND E. GAYLORD and W. N. BURDING

Standard Brands, Inc., New York, N. Y., has announced the appointment of Raymond E. Gaylord as manager of the company's Royal Division, and W. N. Burding as manager of the Fresh Foods Division. Mr. Burding has been with the concern for many years, and Mr. Gaylord was formerly general sales manager of Rumford Chemical Works.

Kentucky-Tennessee Food Co-operative has been formed in Hopkinsville, Ky., as a subsidiary of Eastern Dark Fired Tobacco Growers' Co-operative Association, to operate large vegetable dehydrating plants.

King Milling Co., Lowell, Mich., manufacturer of flour for the Army and Federal Surplus Commodities Corp., was destroyed by fire with damage amounting to $250,000.

Lever Bros. & Unilever, Ltd., recently purchased General Foods Corp.'s controlling interest in its subsidiary, Frosted Foods, Ltd., London, England. The postwar plan is to extend the sale of Birds Eye quick frozen foods to countries outside of the United States and its possessions.

National Starch Products, Inc., New York., has begun the development of a domestic-grown replacement for tapioca, known as "waxy" starch, from "waxy maize." The company has also opened its newly reconstructed plant at Indianapolis, Ind.

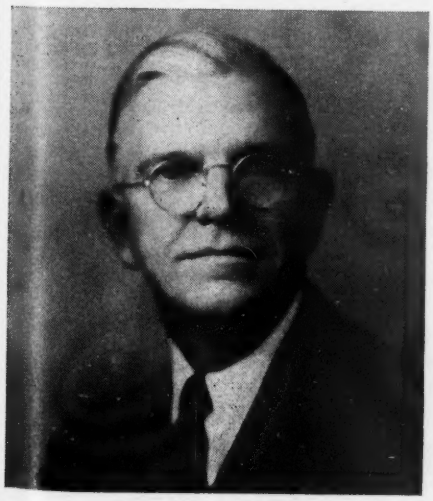
Shiocton Kraut Co., Shiocton, Wis., is installing two complete tunnel type dehydrating units to dehydrate cabbage and potatoes.

Soy Flour Association of Chicago has established a research kitchen where new recipes will be developed and made available to the soy flour trade for distribution to the public.

Stokely Bros. & Co., Indianapolis, Ind., has received the first Army-Navy "E" award presented to a food canning plant. Armour & Co.'s Union Stockyard, Chicago, Ill., Loose-Wiles Biscuit Co., Long Island City, N. Y., and Shefford Cheese Co., Inc., Green Bay, Wis., have also been awarded the "E" pennant.

U. S. Quartermaster Corps has developed a new precooked dehydrated rice pudding for use overseas.

Worcester Salt Co., New York, N. Y., has published a promotion pamphlet for consumer use, entitled "Salt Away Your Vegetables," describing various methods of salting vegetables as a means of preserving them. Several pickle recipes are also given.



DR. EARLE O. WHITTIER

The $1,000 Borden Co. prize for research in the chemistry of milk has been awarded to Dr. Earle O. Whittier, senior chemist for the research laboratories of the Bureau of Dairy Industry of the United States Department of Agriculture.

L. V. HASS

Libby, McNeill & Libby, Chicago, Ill., recently named L. V. Hass general superintendent of the company's canneries east of the Rockies, succeeding A. E. Hansen, who has retired. Mr. Hass has been with Libby for the past eight years.

PERSONNEL

H. E. Babcock, founder of the Grange League Federation and chairman of the board at Cornell University, has been named chairman of the newly formed Emergency Food Commission of New York State. Dean Carl E. Ladd, of the New York College of Agriculture at Cornell, becomes executive director.

N. Laughlin, manager of the Memphis plant of Continental Baking Co., New York, N. Y., has been appointed regional sales manager of the company with headquarters in Chicago.

G. G. Lister, formerly secretary and treasurer of Canadian Canners, Ltd., Vancouver, B. C., has been elected general manager of its subsidiary, Canadian Canners Western, Ltd., succeeding Willis James West.

Carl N. Lovegren, president of the Canners League of California, who recently resigned as president of Hunt Bros. Packing Co., San Francisco, Calif., is now devoting all his time to the Canners League activities.

Dr. Ralph H. Manley, formerly head chemist and chief of the oil and protein division of Northern Regional Research Laboratory, U. S. Department of Agriculture, becomes a member of the research staff of General Mills, Inc. Dr. Manley's work at General Mills will be the development of new industrial uses for vegetable oils, proteins and their derivatives.

John T. McCarthy, president of Jersey Bread Co. and Sandusky Baking Co., both in Ohio, becomes executive assistant to the president of American Bakers Association, with offices in Washington, D. C. Until recently, he had been the baking industry's representative on WPB.

Cecil H. McKinstry has been appointed president of Imperial Candy Co., Seattle, Wash., succeeding the late Chester E. Roberts.

W. T. Parker, manager of Peanut Growers Cooperative, Suffolk, Va., has been given leave of absence to supervise peanut production for the government, working with the Commodity Credit Corp. Mr. Parker will also be in charge of soybean production.

George W. Penny, advertising manager for Rumford Chemical Works, Rumford, R. I., has been elected manager of the Baking Powder Division, in charge of sales and production.

Lorne N. Reynolds, who has been a member of Canada Packers, Ltd., Vancouver, B. C., for 22 years, has been appointed general manager of the company.

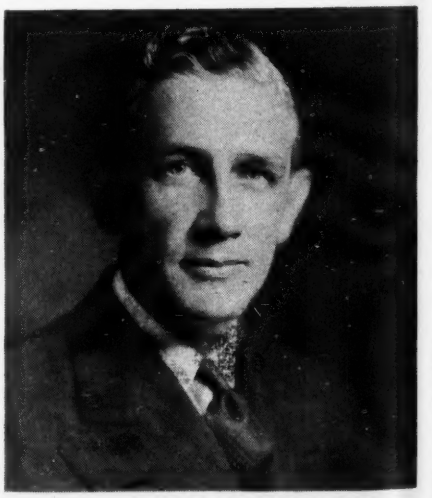
RACHAEL REED

Formerly Mid-west director of consumer relations for Borden Co., Rachael Reed becomes director of consumer relations for the company, with headquarters in New York. Miss Reed has also been director of local council units of National Dairy Council in Nashville, Dayton, Cincinnati and Kansas City.

Norton Simon, head of Val Vita Food Products, Inc., has been elected president of Hunt Brothers Packing Co., San Francisco, Calif., succeeding Carl N. Lovegren, who resigned.

Glen A. Spaulding, manager of oil distribution for Spencer-Kellog & Sons, Inc., Buffalo, N. Y., has received leave of absence to join the oil and fats section of Food Distribution Administration.

Jessie W. Tapp., vice-president of the Bank of America, has been granted leave to become associate administrator to Chester M. Davis, new Food Administrator.



ROBERT L. GARNER

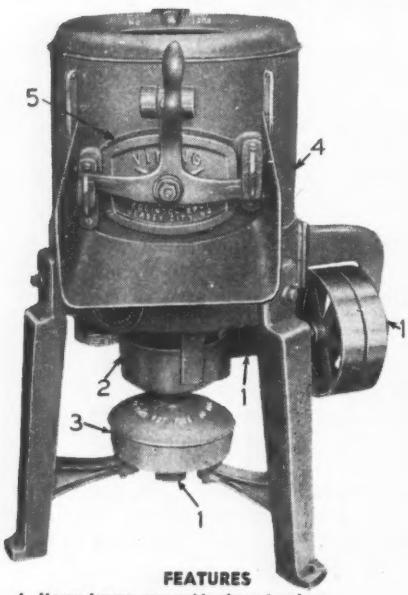
General Foods Corp., New York, N. Y., has elected Robert L. Garner vice-president and treasurer of the company, succeeding the late Louis A. Zahrn, former treasurer. Previous to joining General Foods, Mr. Garner was vice-president and treasurer of Guaranty Trust Co. of New York.

The VIKING PEELER

Essential Equipment for

CANNERS and DEHYDRATORS

of



White Potatoes — **Horseradish**
Sweet Potatoes — **Radishes**
Carrots and Beets — **Turnips and Yams**

• OPERATION

Peels and washes—and drains peelings—**all in one operation;** belt or motor driven.

• CAPACITIES

50 to 60 lbs. per minute—1,000 lbs. per hour
70 to 75 lbs. per minute—1,400 lbs. per hour

• ECONOMY

Waste reduced to absolute minimum—and recoverable for cattle feed. Most economical in first cost, operation, maintenance and space.

FEATURES

1. Heavy bronze removable sleeve bearings.
2. Cut bevel gears, 4 Pitch.
3. 10" dia. thrust bearing running in oil.
4. Genuine carborundum abrasive FUSED onto entire inner surface of peeling Hopper and upper surface of revolving Disc. Abrasive cannot be torn by foreign material in Hopper.
5. Moulded one piece rubber gasket guaranteed water-tight for the life of the machine.

Manufactured by

ROBINSON BROTHERS

153-155 Clarke Avenue
Jersey City, N. J.

Contractors to:

U. S. Navy Department; U. S. Army Medical, Quartermaster & Engineer Corps; U. S. Dept. of Justice; U. S. Veterans Bureau; U. S. Marine Corps; Civilian Conservation Corps; State, County and Municipal Governments.

DEATHS

Everett C. Van Alstine, 46, manager of Waukesha Roxo Beverage plant, Waukesha, Wis., March 25, in Milwaukee, Wis.

Edward H. Beaumont, 55, secretary-treasurer of Hava-Cola Extract & Sirup Co., Nashville, Tenn., March 28, in Nashville.

Peyton T. Carr, 79, retired president of Kehlor Flour Mills, St. Louis, Mo., recently, in St. Louis.

Ralph V. Grayson, 50, director of Frozen Food Institute, Inc., Elizabeth, N. J., and an outstanding technologist and refrigerating engineer in the frozen food industry, April 14, in New York City.

Frederick Hansen, 67, former vice-president of Grocery Store Products Sales Co., New York, N. Y., April 14, in St. Petersburg, Fla.

James W. McMorris, 61, owner of Mcmorris Creamery plants in Ashtabula, Ohio, for 33 years, March 30, in Ashtabula.

John M. Millar, retired vice-president of Lever Bros., Ltd., and former president of Canadian National Exhibition, April 7, in Toronto, Canada.

William J. Shortreed, 63, vice-president and member of the board of directors of H. J. Heinz Co., Pittsburgh, Pa., recently, in Pittsburgh.

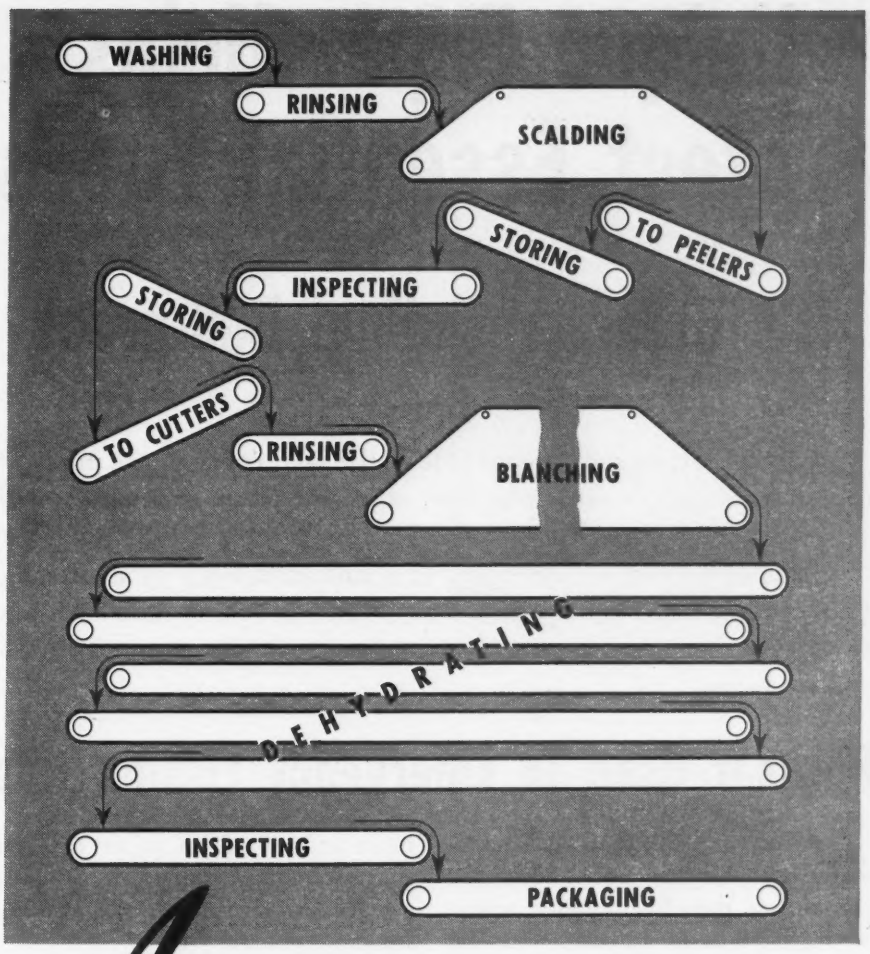
ASSOCIATED INDUSTRIES

Bemis Bro. Bag Co., St. Louis, Mo., has increased its facilities for the production of multiwall bags, to meet the increasing war needs for packaging in the South, by relocating equipment at Mobile, Ala. This move will also result in a saving of transportation facilities.

Caterpillar Tractor Co., Peoria, Ill., the Philadelphia plant of Container Corp. of America and Foote Bros. Gear & Machine Corp., Chicago, Ill., have been presented the Army-Navy "E" award for excellence in production. Carrier Corp. of Syracuse, N. Y., has been reawarded the Army-Navy "E" for the third time.

Monsanto Chemical Co., St. Louis, Mo., has elected Charles Belknap, executive vice-president, to the presidency. He succeeds Edgar M. Queeny, who becomes chairman of the board. Mr. Belknap will be in charge of operations, engineering and industrial relations.

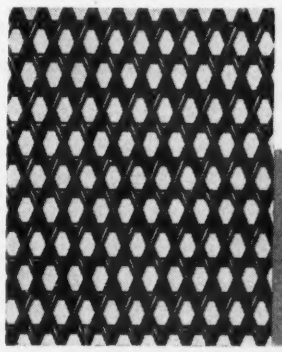
National Can Corp., New York, N. Y., has announced that Saul L. Buschman has returned to become president of the company, succeeding L. F. Gieg.



"Assembly Line" METHODS OF VEGETABLE DEHYDRATION

Audubon "Metalwove" Continuous Processing and Conveying Belts of "Flexibly Woven" Wire provide the modern "assembly line" methods of automobile (now tank, airplane and engine) manufacturers, for dehydrating and other food plants. Every production step from the harvested vegetable to the packaged product is a smooth, synchronized F-L-O-W, adjustable to the output desired or the processing-time requirements of various vegetables.

NO PRODUCTION BOTTLENECKS Vegetables "flow" through one process after another, each Metalwove Belt being gravity "self-loading." Labor in loading or unloading is thus eliminated in this modern, "trayless" system. Metalwove Belts can be supplied with any size opening between wires to assure maximum water drainage or heated air circulation; further, the wires can be of any diameter necessary to carry the load. Retaining edges of flexible metal plates or woven wire can be supplied to keep vegetables from falling off the belts; likewise, cleats or flights can be supplied to remove vegetables from Lye Peelers or Underwater Storage, or for elevating vegetables to the next process or to the floor above. . . . Our engineers will gladly assist you in selecting the best type of weave and specification for every processing belt in your plant, whether it be existing, pilot, or contemplated. Catalog on request.



AUDUBON
WIRE CLOTH CORPORATION
Subsidiary of Manganese Steel Forge Co.
2807 Castor Ave · Philadelphia · Pa.
Representatives in Most Principal Cities

Unique Paper Helps Protect Essential Foods

Withstands boiling

Resists grease

It's Grease-resisting. Boil-proof

With food playing such a vital role in the war, every ounce must get utmost protection—must reach its objective fresh and wholesome. That's where Patapar* Vegetable Parchment comes in. This paper has double protective qualities. It withstands *both* moisture and grease. Soak it in water—even *boil* it, and it will remain firm and strong. Pour grease on it, then rub and see how it resists penetration.

*Reg. U.S. Pat. Off.

Patapar Used In Emergency Fishing Kits

As an aid to shipwrecked men, a watertight kit has been developed containing complete fishing equipment. Directions for using the kit must be printed on paper that can stand wetting. Patapar was tested in salt water for weeks, dried and found intact. It got the job.

War Time Packages Patapar Lined

War demands and shortages have resulted in important new uses of Patapar. For example, many foods formerly put up in tin cans are now being packed in special containers fortified with inner liners of Patapar.

Room for one more ?

To Users of Patapar:

With transportation such a problem today, many of our customers are making a habit of checking their stocks at intervals and ordering in advance. This helps assure a continuous supply.

Hot Weather Ahead!

Food Wrappers Face Severe Test

Heat brings moisture and grease to the surface of foods. This surface moisture and grease can work fast on wrappers causing them to "fog up"—disintegrate—leak. The result: spoilage. The way to avoid hot weather trouble is to use a wrapper that withstands both moisture and grease—like Patapar.

With its unique characteristics Patapar has come to the aid of literally hundreds of products that have presented packaging problems.

In hot weather or cold you can count on Patapar to keep foods wholesome and appetizing.

Are YOU Faced With A War Packaging Problem?

Maybe Patapar can help you. For full information write us outlining your problem in detail.

Paterson Parchment Paper Company

Headquarters for Vegetable Parchment since 1885

Bristol, Pennsylvania

West Coast Plant: 340 Bryant Street, San Francisco, California

Branch Offices: 120 Broadway, New York • 111 West Washington Street, Chicago

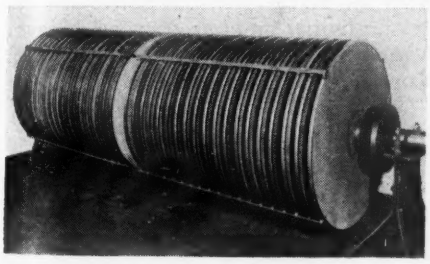
FOOD EQUIPMENT NEWS

Floor Covering

SPRAYED or troweled on over metal, wood, concrete or other floorings, "Dek-tred," produced by Goodyear Tire & Rubber Co., Akron, Ohio, is said to be resistant to the action of oils, greases, gasoline, salt and cleansing materials such as soap. It also has high non-slip properties. When placed in proper thickness and allowed to dry for at least eight hours, it will withstand heavy traffic. As it is self-leveling, repairs can be made without the appearance of patching. A single covering of about one-thirty-second of an inch thickness weighs 1.5 oz. per sq.ft. when dry.

Clarification Filter

A STURDIER leaf design than heretofore developed has been incorporated in a new rotary leaf clarification filter built by Swenson Evaporator Co., Div. of Whiting Corp., Harvey, Ill. The leaf is specially designed to produce a uniform tautness of screen, giving longer screen



New design of rotary leaf clarification filter

life and eliminating need for clamping rings and bolts. The unit illustrated contains 40 leaves of 44½ in. diameter.

Hopper Attachment For Truck

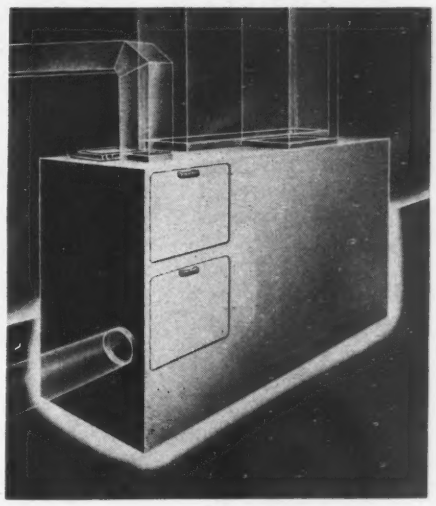
To make possible a standard method of handling bulk materials by factory truck, Towmotor Corp., 1226 East 152nd St., Cleveland, Ohio, has developed a hopper attachment for its standard lift truck models of the fork type. This hopper is available in various sizes. To provide a firm carrying position and permit rapid tilting in dumping hopper loads, the attachment is carried directly on the fork support bar of the lift truck by means of a hook arrangement which is an integral part of the hopper. The hopper gate is opened for discharge by pulling down a hand lever. Hopper bottom is slanted to assure complete discharge. When the truck is required for other duties, the hopper is readily removed, and several units can be handled in turn by one truck, one being moved and discharged while the others are filling.

Removable Liner Pump

IN order to save critical materials from which its rotary pumps are made, Blackmer Pump Co., Grand Rapids, Mich., has announced a rotary pump with removable liner. This is designed like all Blackmer standard rotary pumps, but, when wear affects its capacity, the liner can be removed and replaced with a new one. To do this, involves only removal of the pump heads, driving out the old liner and inserting the new, without disturbing the pump or piping. No fitting is necessary, as the buckets are self-adjusting.

Humidity Control Units

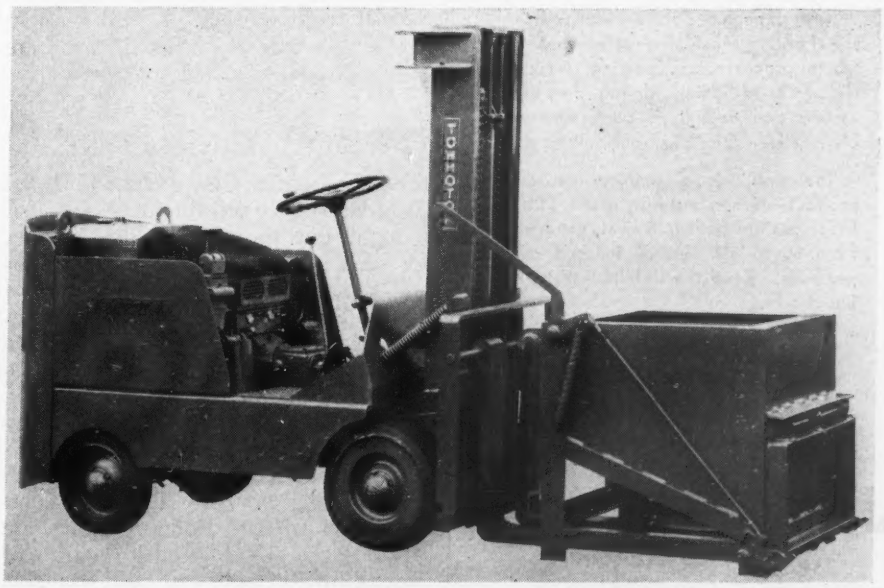
SURFACE COMBUSTION CORP., Toledo, Ohio, has brought out a "package" series of "Kathabar" dehumidifying units, suitable for dehydrated food processing, packaging and storage. In the past, this system has been available only in large central units ranging up to capacities of 100,000 cu.ft. per minute. The new "package" units are available in sizes of 750, 1,500, 3,500 and 5,000 cu.ft. per minute. They are suitable for maintained desired relative humidities not only in dehydrated food manufacture but also in the storage of cereal products, fruits, vegetables, and other foods. In one installation in a dehydrated food plant, after the food has been reduced to a low moisture content in a dehydrater, it is stored in a "Kathabar" conditioned atmosphere, in which further reduction in moisture is made. Storage in this manner also avoids moisture regain.



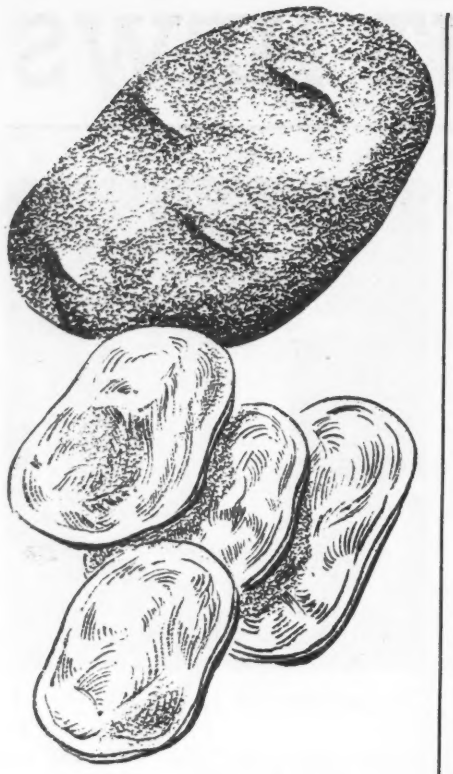
"Package" unit for dehumidifying

Truck Enamel

S. C. JOHNSON & SON, INC., Racine, Wis., has brought out a wax-fortified enamel specially developed for exterior painting jobs on such equipment as dairy and bakery trucks. Because of its wax content, it is claimed that this enamel has unusual qualities of ruggedness, good appearance and easy maintenance. It is made for application with



Lift truck of fork type with hopper attachment



Crisp, Nut-Like
AND Profitable

Crispness and the tasty, nut-like flavor of potato chips produced by the

FERRY CONTINUOUS POTATO-CHIP MACHINE

are automatically maintained — h o u r after hour and day after day.

Raw, unpeeled potatoes are fed into the FERRY Machine — after that the whole process . . . peeling, washing, slicing, conditioning, drying, f r y i n g, salting and cooling is performed mechanically—with "push-button" control.

The result is a uniform superfine product—turned out with profit. FERRY Machines are built in 5 sizes, producing from 50 to 350 lbs. of finished chips per hour. Read the details. Write for Bulletin FI.

ALSO MAKERS OF:
SLICERS AND AUTOMATIC SLICER FEEDERS,
CAN WASHING MACHINERY

J. D. FERRY CO.
129 SO. CAMERON ST.
HARRISBURG, PA.

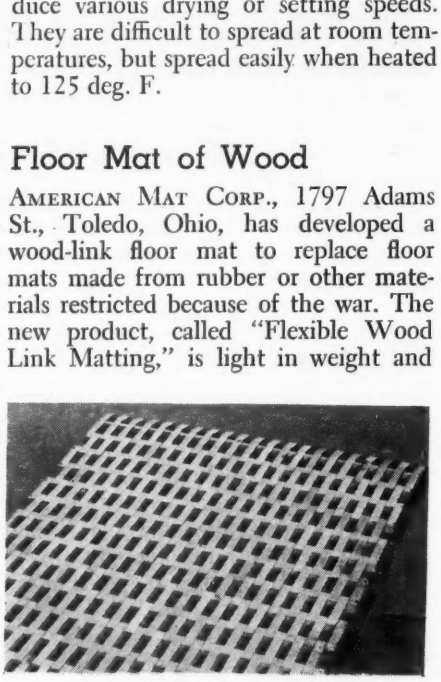
a spray gun and may be applied over any other good exterior type enamel. In addition, the product is said to set quickly.

Vegetable-Base Adhesive

PAISLEY PRODUCTS, INC., has brought out a line of vegetable-base adhesives under the trade name of "Vegimal." These can be applied by machine or brush. The products are viscous, light tan colored liquids, freely miscible with water, and weighing 10 lb. ger gal. They are made from domestic starches with added plasticizing chemicals that produce various drying or setting speeds. They are difficult to spread at room temperatures, but spread easily when heated to 125 deg. F.

Floor Mat of Wood

AMERICAN MAT CORP., 1797 Adams St., Toledo, Ohio, has developed a wood-link floor mat to replace floor mats made from rubber or other materials restricted because of the war. The new product, called "Flexible Wood Link Matting," is light in weight and



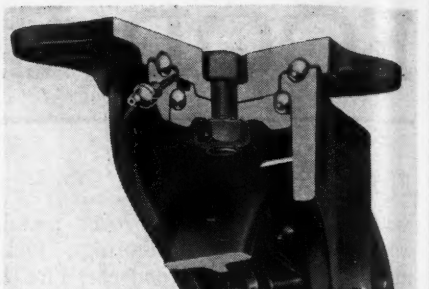
Floor mat made of wood links.

can be rolled or folded for easy handling and cleaning. It comes in natural wood color, is 1 in. thick and stock sizes are 18x32 in., 24x38 in., and 30x44 in. Special sizes up to 36 in. wide and in any length can be obtained. Ends are beveled to reduce danger of tripping.

Equipment Casters

RAPID-STANDARD CO., INC., 535 Bond Ave., N. W., Grand Rapids, Mich., has brought out the "Nicro Steel" caster for such portable equipment as pumps and tanks. It embodies an adaptation of "Nicro Steel" castings to new principles of caster design, including two complete large diameter ball raceways. The strength of the materials permits a long lead or "rake," the basis of easy swiveling.

These casters can be furnished with either metal or ABK Resinoid floor-protective wheels. Roller bearings are standard in most models; oilite or porous iron bearings are also available for metal wheels. Wheel sizes range



New design of caster employing "Nicro Steel" castings

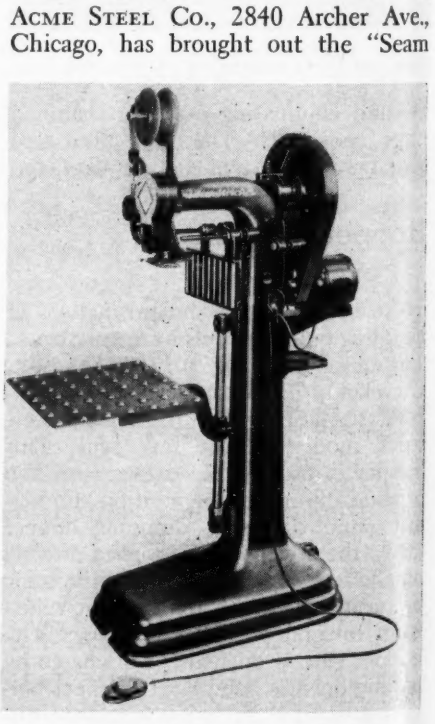
from 3 in. to 5 in. diameter. Pressure lubrication fittings are provided in both swivel and wheels.

Screw Conveyor Trough

LINK-BELT CO., 307 N. Michigan Ave., Chicago, has developed a screw conveyor trough that is a combination of steel bottom, wooden sides and wooden cover—lag-screwed together to form a complete, tight enclosure for the screw and the material that it conveys. Thus a substantial amount of steel is saved over what would be needed for all-steel construction. A further advantage is that the steel bottom can be readily removed for access and cleaning.

High Speed Carton Stitcher

ACME STEEL CO., 2840 Archer Ave., Chicago, has brought out the "Seam



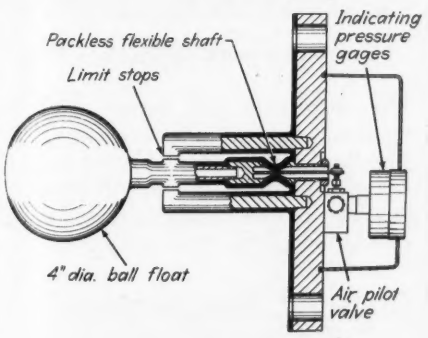
Carton seam stitcher designed to speed top stitching

Silverstitcher," a machine said to speed up the sealing of carton tops by about four times. It is said to be especially efficient when employed in straight line production methods. A vertical roller guide and the arrangement of the seam unit are claimed to assure tight, positive closure for the carton top. The machine is designed to form and drive as many as 285 steel stitches per minute, drawing the material from a 10-lb. spool of wire. A solenoid control is provided for starting or stopping the stitching mechanism.

An overlap style container is suggested for use with this seam stitcher. To complete the stitching operation, the carton flaps are slipped through the open head device. Since the table and the vertical roller guide are adjustable, the machine can accommodate containers of varying depths and widths.

Liquid Lever Controller

Moore Products Co., H and Lycomings Sts., Philadelphia, Pa., is making a completely rubber or Neoprene covered liquid level controller designed for installation in a standard rubber covered tee fitting, or for direct mounting in a tank containing corrosive liquid. A rubber covered flexible steel shaft avoids any necessity for packing glands or bearings, and also provides a simple, friction-free method of transmitting the float motion to an air pilot valve or micro-switch, as desired.



Sketch of rubber covered liquid level controller

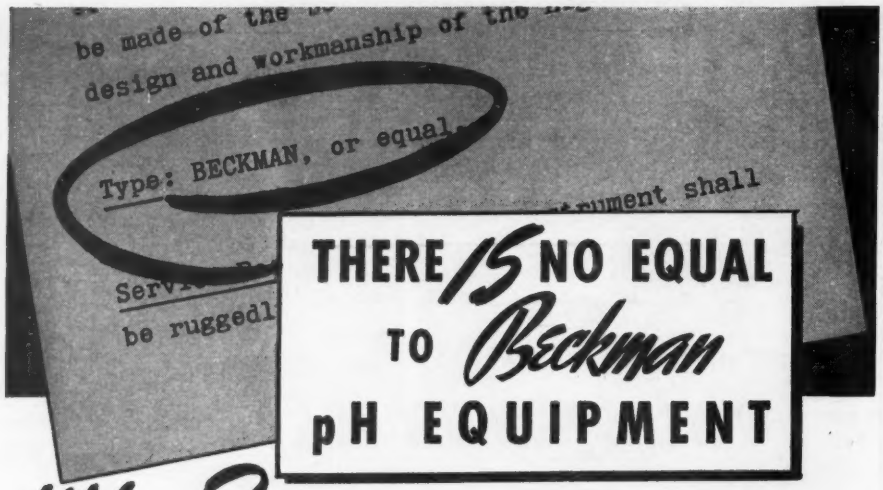
The flexible shaft consists of a formed tube similar to a Bourdon tube. A flat lever inside this tube connects directly with the air pilot valve or micro-switch for controlling the liquid level. Operation is said to be unaffected by wide variations of pressure and temperature.

The controller operates on the principle of force change due to buoyancy and is said to have a sensitivity such that a buoyancy change of less than 8 oz. will result in full travel of the diaphragm-operated control valve. This permits the use of a small 4-in. diameter ball float and a short float arm of ap-

Speed up PROCESS—
USE AMERICAN MONORAIL

★ Whatever the process — it can be speeded up with American MonoRail Handling Equipment. A great deal of manual handling can be eliminated. From cooking and cooling process to piling of finished goods, American MonoRail will speed up production by rapid, careful transfer from one operation to another. Available for manual, automatic or electric operation. Let an American MonoRail Engineer show you the possibilities of eliminating production delays and reducing handling cost. Write today.

THE AMERICAN MONORAIL CO.
13125 Athens Avenue Cleveland, Ohio
★



THERE *IS* NO EQUAL TO *Beckman* pH EQUIPMENT

Why? ...*because* with no other make of modern pH equipment can you maintain *continuous* pH control on boiling-hot liquids!

Only Beckman has developed High Temperature Glass Electrodes that can be immersed directly in tanks, flow lines, etc. (no sampling devices required) for continuous operation in process solutions up to 212° F. (100° C.).

...*because* with no other make of pH equipment can you maintain *continuous* pH control in highly alkaline solutions, *even in the presence of sodium ions.*

Beckman alone has perfected High pH Glass Electrodes which permit accurate pH control in the high pH ranges even when sodium compounds are present. This important feature has extended the usefulness and benefits of modern pH control to entirely new fields where alkaline solutions, in combination with sodium ions, have heretofore presented difficulties.

...*because* with no other make of pH equipment can you maintain *continuous* and automatic check on as many as SIX different pH stations with only ONE pH instrument.

Only Beckman has perfected an Automatic Multiple Glass Electrode Switch for use with multiple station recorders to record pH from as many as *six* stations through *one* Beckman Automatic pH Indicator.

THESE are only a few of the *many* exclusive pH developments made by the Beckman research staff... developments that are so fundamental and far-reaching that they antiquate all other pH equipment. So for your own protection, when you specify pH equipment, make sure you get BECKMAN. *There is no "equal"!*

LET OUR ENGINEERING STAFF HELP YOU in adapting Beckman pH control to speeding up your production... cutting waste... reducing corrosion... and increasing the overall efficiency of your processing operations. If you use water or water solutions anywhere in your plant operations, investigate! **Beckman Instruments Division, National Technical Laboratories, South Pasadena, California.**

What Every Executive Should Know About pH

Send for this helpful booklet that explains the fundamentals of pH control—what it is, how it's used, where it fits into modern production processes. IT'S FREE!

BECKMAN INSTRUMENTS CONTROL MODERN INDUSTRIES

proximately 5½ in. length. Interface level control of liquids having a specific gravity difference as small as 0.05 can be obtained by using larger floats and longer float arms.

Elliptical steel floats having ⅛-in. rubber covering are used where wider level changes are desirable. Rubber covered stops are provided to keep the flexible shaft well within its elastic limit.

Circulating Steam Jets

THREE new circulating steam jets have been announced by The Duriron Co., Dayton, Ohio. Besides being corrosion resistant, these jets are said to have the advantage of fitting snugly to the inside walls of either square or circular tanks, with a maximum projection of 4½ in.

Steam jet for agitating liquids in tanks.

The suspended and center discharge types may be used in tanks of any depth. The floor type is adaptable for tanks of any depth up to 60 in. All types are designed to give complete agitation and circulation of the tank contents.

Constant Temperature Cabinet

FOR USE in laboratories requiring refrigeration, American Instrument Co., Silver Spring, Md., has designed a constant temperature dry ice cabinet. Providing temperatures from −90 deg. F. up to 220 deg. F., with a constancy of plus or minus 0.5 deg. F., it is intended for use where mechanical refrigeration is not justified. It is available in two ranges: 0 deg. F. to −90 deg. F., and 220 deg. F. to −90 deg. F.

Temperatures of −65 deg. F. and −90 deg. F. are attained in 15 and 30 minutes, respectively, from an initial temperature of 85 deg. F. Temperatures can be held at −40 deg. F. and −90 deg. F. in an ambient temperature of 85 deg. F. for 24 hours with 40 lb. and 60 lb. of dry ice, respectively.

The cabinet is portable. It is ready for operation after packing with dry ice and plugging into an electrical supply. It then requires no further attention

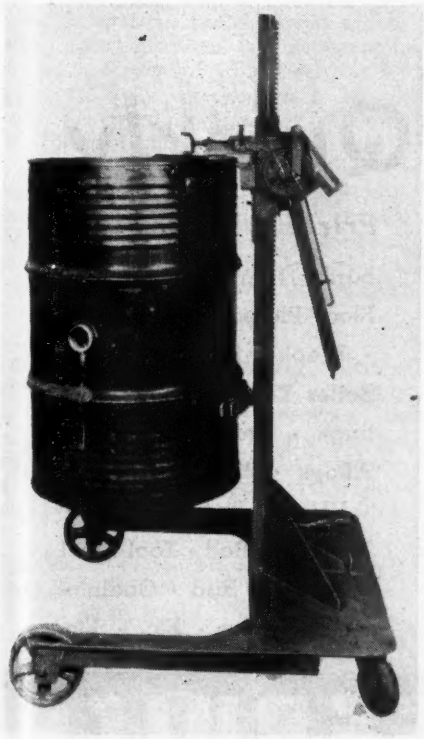
until a new charge of dry ice is required. The working chamber is 2x2x2 ft. and has a hinged removable cover in which is incorporated a 5-ply vacuum-sealed plate glass window. Another hinged cover is provided for access to the dry ice compartment, which has a capacity of 75 lb. Air is circulated by means of a fan, below the dry ice compartment.

Traffic Zoning Paint

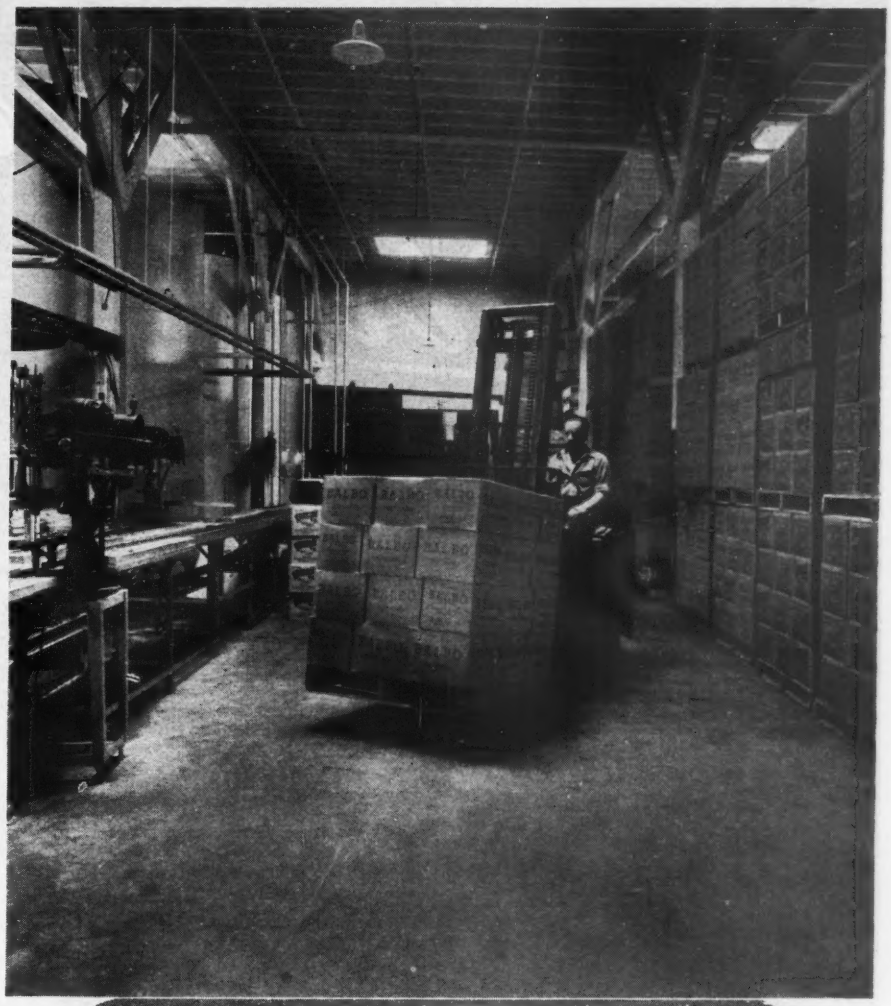
THOMSON-PORCELITE PAINT CO., 829 No. Third St., Philadelphia, Pa., has developed "Porcelite" traffic zoning paint, for highly permanent and visible floor and drive markings. This paint can be applied to wood, stone, asphalt, composition and cement and is said to do the marking job in one coat.

Drum Carrier

ERNST CARRIER SALES CO., 1456 Jefferson Ave., Buffalo, N. Y., has introduced the 14 in. Lift Model Ernst Carrier with built-in brake, for placing and removing 55-gal. drums or barrels on and off skids, scales and platforms. The brake feature is claimed to provide smooth, slow and easy lowering of the container from top position. To raise the container the full 14 in. off the floor, the handle is lowered from the up position to the horizontal position, where it automatically locks. To lower the container, the handle is unlocked and the brake applied. An advantage claimed is operation by one man. Capacity is 700 pounds.



Carrier for drums or barrels with built-in lowering brake.



One trip does the Trick!

COUNT those cartons. That's right . . . 36, but they're all moved and stacked as a single load! In one trip Towmotor carries unit loads as heavy as 10,000 pounds from packing to storage at speeds as fast as 880 feet a minute . . . and then stacks them as high as 25 feet!

It will pay you to learn how and why a streamlined system of materials handling saves you time and money at every turn. You'll find ideas galore in "The Inside Story." For a free copy write Towmotor Corporation, 1222 E. 152nd Street, Cleveland, Ohio.

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BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Canning Equipment—A new edition of its complete catalog of canning machinery and supplies has been issued as the 190-page illustrated Catalog No. 700 by A. K. Robins & Co., Inc., Lombard & Concord Sts., Baltimore, Md.

Conveyor Equipment—An 8-page illustrated booklet, No. 2067, listing the sizes of cast tooth sprocket wheels, their prices, dimensions and weights, has been published by Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

Conveyors—A descriptive 16-page catalog illustrating various models, accessories, applications and specifications of conveyors essential to the war program, has been published under the title "Lamson Roller Gravity Conveyors," by Lamson Corp., Syracuse, N. Y.

Deaerating Equipment—A comprehensive 36-page catalog of various types of deaerators, together with cross section photographs, line diagrams in color, and illustrations of various designs constructed to meet space limitations, has been issued as Publication No. 3005, by Cochrane Corp., 17th & Allegheny Ave., Philadelphia, Pa.

Dehumidifiers — "Kathabar" dehumidifiers, for use in air conditioning systems and industrial operations where it is important to have accurate control of the relative humidity, are fully described in a 14-page booklet published by Surface Combustion Co., Toledo, Ohio.

Heat Exchangers—"Introducing Downingtown Shellfin Heat Exchangers" is the title of the illustrated pamphlet discussing the multiple installation of Shellfin units, issued by Downingtown Iron Works, Heat Transfer Division, Downingtown, Pa.

Materials Handling Equipment — Specifications and dimensions are given and various types of portable stackers and conveyors are described and illustrated in the 12-page pamphlet, "Portable Stackers and Conveyors for Storage and Warehouse Service," published by Jeffrey Mfg. Co., Columbus, Ohio.

Metal Baskets—Twenty-two types of baskets constructed of wire, wire mesh cloth, or expanded metal, used in such processes and operations as blanching, cleaning, paraffining and pickling, are illustrated in the brief 4-page pamphlet, "What's Your Basket Problem?"; published by Buffalo Wire Works Co., Inc., 452 Terrace, Buffalo, N. Y.

Processing Equipment — Various types of pumps, air and gas compressors, generators, air conditioning and refrigeration equipment are illustrated in the 20-page booklet, WP-1099-B37, entitled "Equipment for the Process Industries," by Worthington Pump & Machinery Corp., Harrison, N. J.

Refrigeration Equipment—"Perfect Refrigeration for Food Storage Rooms," Catalog 22, Section 6-A, which describes and illustrates the use of the Dole vacuum cold plate evaporator for refrigeration of food products, has been published by Dole Refrigerating Co., 5910 N. Pulaski Road, Chicago, Ill.

PLANT SUPPLIES

Brazing Alloys—"Sil-Fos and Easy Flo" is the title of an 18-page catalog, No. 12-A, which describes how the brazing of metals may be applied to equipment for operations such as refrigeration, heat exchange and air conditioning; issued by Handy & Harman, 82 Fulton St., New York, N. Y.

Corrugated Materials—Ingenious methods that can quickly provide simple and attractive wartime window displays are illustrated in the 11-page booklet, "Sherman Display Guide," published by Sherman Paper Products Corp., Newton Upper Falls, Mass.

Filter Cloths—Representative samples of cotton, wool, woven glass and synthetic filaments fabricated to produce acid-proof, alkaline-proof and high temperature resistant filter cloths for industrial filtration, are illustrated in a bulletin, "Filter Cloths," issued by William W. Stanley Co., Inc., 401 Broadway, New York, N. Y.

Power Transformers—"Power Transformers for Mercury-Arc Rectifiers" describes and illustrates the interior and exterior construction of two G-E mercury-arc rectifier transformers, typical of sizes both above and below 1,000 kw.; published by General Electric Co., Schenectady, N. Y.

Protective Equipment—Illustrations and descriptions of head and body protection for men and women industrial workers appear in the 4-page Bulletin 143 issued by Strauss Co., 925 Liberty Ave., Pittsburgh, Pa.

Record Card—Available to all maintenance engineers, a motor record card, GES-1536A, 4x6 in., for the recording of essential information on each motor, has been issued by General Electric Co., Schenectady, N. Y.

Switches—Constructed as a single unit instead of two separate contactors, the Furnas magnetic reversing switch is described and illustrated in two 4-page pamphlets, Bulletins 4216 and 4301, issued by Furnas Electric Co., 423 McKee St., Batavia, Ill.

PACKAGING

Labeling Equipment—The mechanical application of labels to bottled and packaged goods is illustrated in the pamphlets, "A Quality Machine in Every Particular" and "The New Ermold Labeler"; published by Edward Ermold Co., Hudson, Gansevoort & Thirteenth Sts., New York, N. Y.

Packaging Machines—Two types of package filling machines, built of hardwood and requiring a minimum of strategic metals, together with sealing machines of similar construction, are discussed in a leaflet, "Triangle Victory Model Packaging Machines," issued by Triangle Package Machinery Co., 906-914 N. Spaulding Ave., Chicago, Ill.

MISCELLANEOUS

Brewing—"Technical Material for Brewing" is the title of a 16-page booklet summarizing the principal technical products that help overcome difficulties in the production of fine beers; published by Wahl Institute, Inc., 58 West Jackson Blvd., Chicago, Ill.

Dairy Sanitation—Vital wartime data on safe, successful, milkstone-removal technics designed for saving manhours, increasing sanitation efficiency and conserving milk and milk product processing and handling equipment are given in a 12-page manual, "Oakite Milkstone Remover," released by Oakite Products, Inc., 22 Thames St., New York, N. Y.

Fishing Sanitation—Various essential wartime sanitation and maintenance technics utilized in the fishing industry to facilitate cleaning, conserve man power and increase efficiency are concisely described in a 10-page pamphlet published by Oakite Products Inc., 22 Thames St., New York, N. Y.

Research Laboratories—"Service at your Service" is the title of a 12-page booklet prepared for plant managers and technologists describing the scientific services offered by Food Research Laboratories, Inc., 48-14 33rd St., Long Island City, N. Y.

Rubber Conservation—To assist in mechanical rubber conservation, a booklet "How to Lengthen the Life of Mechanical Rubber Goods," describing in 21-pages ways to increase service from rubber belting and hose, has been issued by Pioneer Rubber Mills, 353 Sacramento St., San Francisco, Calif.

Testing Equipment—A portable test kit for accurate determination of the dissolved oxygen content of deaerated boiler feedwater is briefly described in the bulletin W-210-B28, issued by Worthington Pump & Machinery Corp., Harrison, N. J.

BOOKS

Food Facts and Faults

FOOD FOR PEOPLE. By Margaret G. Reid. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y., 1943. 653 pages; 9¼x6 in.; cloth. Price, $4.

Here's a book that men in responsible positions in the food processing industries ought to read—for two reasons. First, it gives a broad, though concise, picture of the present economics and possible future trends in respect to food distribution, including legislation and regulations affecting the industry's operations. Secondly, and more important, this is one of those books that food men must know about in order to understand the influence that it may have on the thinking of food consumers and especially the organized consumer groups.

New-Deal type of thinking about the need for improvements in food marketing efficiency, the value of controls and restraints and need for better nutritional standards is reflected in the author's writings. Some of the contentions will stand up, while others are debatable. Those which are sound will be valuable to food executives in their postwar planning. The others will be useful as pointers to the type of thinking that must be counteracted by the food industries through the medium of publicity, advertising and contact with government food officials and consumer groups.

Bacteriology for Beginners

FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY. By A. J. Salle. Published by McGraw-Hill Book Co., 330 W. 42d St., New York, N. Y., 1943. 617 pages; 6½x9¼ in., cloth. Price, $4.

Because of the importance of bacteriology in food processing, technologists and others who direct the operations in food plants need at least a working understanding of the subject. And here is a book that can go far toward giving them such an understanding. It is written for those who are beginning the study of bacteriology and is concerned chiefly with a discussion of the important principles and facts of bacteriology upon which to base an advanced study of the subject.

Knowledge of chemistry is necessary for a thorough understanding of the book, but even when lacking that knowledge the reader can grasp many fundamental principles and facts of basic importance to food plant operations.

Among the 27 chapters in the book, of particular interest are those on the bacteriology of food, milk and milk products, and water and air; yeasts and molds; enzymes of bacteria; the decomposition and putrefaction of proteins; the fermentation of carbohydrates and related compounds; sterilization, disinfection and disinfectants; and the effect of environment upon bacteria.

Now in its second edition, the book has been completely revised and entirely rewritten to include the advancements that have taken place in all phases of bacteriology.

Facts of Food Poisoning

FOOD POISONING. By G. M. Black. Published by the University of Chicago Press, 5750 Ellis Ave., Chicago, Ill., 1943. 132 pages; 6x9¼ in.; cloth. Price, $2.

The ever-impending threat of suits against food packers in alleged cases of food poisoning makes this scientific and historical discussion of the subject of practical value to food companies and their legal departments or representatives. The author covers chemical poisoning in food, poisonous plants and animals, botulism, staphylococcus food poisoning, salmonella, alpha-type streptococci in relation to food poisoning, the significance of other bacteria in food poisoning and infections differentiated from food poisoning. The author approaches his subject from the view point of the physician.

The historical data cited are evidence of the safety of commercially processed foods. For instance, in 359 outbreaks of botulism in the United States between 1899 and 1941, only 44 are attributed to commercial foods.

Small-Scale Dehydration

DEHYDRATION OF FRUITS AND VEGETABLES AND UTILIZATION OF DEHYDRATED PRODUCTS. By J. G. Woodroof, W. E. DuPree and Helen H. Thompson. Published as Bulletin 225 by Georgia Experiment Station, Experiment, Ga. 1943. 35 pages; 6x9 in.; paper. Free.

Information useful in small-scale dehydration is presented in this bulletin, including how to prepare fruits and vegetables, how to dehydrate and how to package, store and rehydrate. A table lists various fruits and vegetables, gives the varieties suitable for dehydration, the form for dehydration, the treatment, tray loading, moisture content and average time for dehydration. Another table gives information on rehydration and serving.

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INVOLUTE TYPE FOR CONE-SHAPED SPRAY

for WASHING • RINSING • COOLING • HUMIDIFYING

Get the most out of your Spraying Equipment without unnecessary power or liquid waste.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute type producing a fine cone-shaped spray with minimum energy loss, and Yarway Fan type producing a flat, fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

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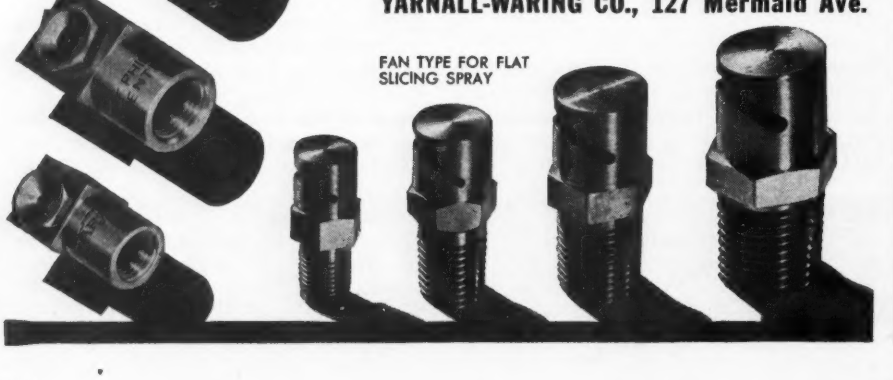


PATENTS

Fat-soluble Vitamins A and D Incorporated Into Aqueous Medium—Loran O. Buxton, Harrison, and Sol T. Lipsius, Newark, N. J., to National Oil Products Co., Harrison, N. J. No. 2,311,517. Feb. 16, 1943.

Fruit Mechanically Marked in Continuous Manner—Harold J. Mumma, Glendale, and Zenas Leonard, Burbank, Calif. No. 2,311,563. Feb. 16, 1943.

Cream Treated With Molecularly Dehydrated Phosphate in Ratio of ⅛ to 2 Oz. Per 10 Gal. Preliminary to Churning to Make Butter—Charles Schwartz, to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2,311,598. Feb. 16, 1943.

Cultured Buttermilk Made to Contain Small Amount of Molecularly Dehydrated Phosphate to Improve Flavor and Minimize Wheying—Charles Schwartz, to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2,311,599. Feb. 16, 1943.

Fish Oils Deodorized by Hydrogenating at Normal Temperatures and Elevated Pressures in Presence of Catalyst Followed by Aeration With Nonreactive Gas—James G. Blasco, East Elmhurst, N. Y., to Natural Vitamins Corp. No. 2,311,633. Feb. 23, 1943.

Confections Coated on Top and Bottom Ends With Aid of Mechanical Device—Carl R. Taylor, Cleveland Heights, Ohio, to Cream Cone Machine Co., Cleveland, Ohio. No. 2,311,709. Feb. 23, 1943.

Eggs Mechanically Graded on Weight Basis—William Chester Wyland, Albambra, Calif., to J. W. Wyland & Sons, Inc., San Gabriel, Calif. No. 2,311,722. Feb. 23, 1943.

Meat Ground and Mechanically Shaped Into Cylindrical Packaged Form Preparatory to Slicing Into Disk-like or Patty-shaped Units—Harry S. Lee, Plymouth, Mich. No. 2,311,843. Feb. 23, 1943.

Sucker-type Confections Frozen in Molds Shaped to Permit Removal Without Breaking or Distorting Stick Handle—Warren E. Neilson, York, Pa. No. 2,312,046. Feb. 23, 1943.

Hood Caps Applied to Filled and Sealed Bottles by Mechanical Means—Isaac A. Wilcox, to Oswego Falls Corp., Fulton, N. Y. No. 2,312,141. Feb. 23, 1943.

Oxygen-containing Air Swept From Partially Filled Carbonated Beverage Bottles by Causing Foam to Form Through Release of Gas Under Pressure—Charles Schmutzer, Irvington, and Kurt Manrodt, Newark, N. J., to Hoffman Beverage Co., Newark, N. J. No. 2,312,288. Feb. 23, 1943.

Flour and Other Grain Products in Bulk Freed From Insect Infestation by Compacting Product to Half Prior Volume Through Application of Centrifugal and Centripetal Forces and Subjecting to Disruptive Electrical Discharge—Franklin S. Smith, New Haven, Conn. No. 2,312,368. March 2, 1943.

Casein Curd Containing Not Over 70 Percent Moisture Mixed With Dry Powdered Sodium Fluoride to Produce Stable Granular Product Adaptable for Shipment in Bags—Francis Clarke Atwood, to Atlantic Research Associates, Inc., Newtonville, Mass. No. 2,312,467. March 2, 1943.

Liquid Food Material Containing Heat Coaguable Protein Subjected to at Least Two Heat Zones in Course of Drying—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,312,474. March 2, 1943.

Salad Dressing Emulsion Given Enhanced Smoothness and Increased Stability Through Addition of Carob Gum and Edible Organic Acid—Morris H. Joffe, to Emulsol Corp., Chicago, Ill. No. 2,313,033. March 2, 1943.

Normally Dry Material Sterilized by Heating at 110 Deg. F., Subjecting to Vacuum, Followed by Heating to as High as 240 Deg. F. in Presence of Ethylene Oxide Gas—Carrol L. Griffith and Lloyd A. Hall, to Griffith Laboratories, Inc., Chicago, Ill. Reissue No. 22,284. March 9, 1943.

Fruit Sized by Weight During Mechanical Handling—Frank W. Cutler, Winslow, Wash., to Food Machinery Corp., San Jose, Calif. No. 2,313,051. March 9, 1943.

Variegated Composition Ice Creams Packaged in Predetermined Ratio in Individual Container by Mechanically Controlled Proportioning—Aaron Friedman, to Joe Lowe Corp., New York, N. Y. No. 2,313,060. March 9, 1943.

Meat Products Forced Into Casings Under Suction Instead of Applied Pressure—John E. Dyrek, to Armour and Co., Chicago, Ill. No. 2,313,229. March 9, 1943.

Starch-making Residues Made to Contain Yeast, Water-soluble Grain Protein, and Phosphorus-containing Derivative as High Nutritive Ingredient for Animal Feed—Herman H. Schopmeyer, Hammond, Ind., to American Maize-Products Co. No. 2,313,275. March 9, 1943.

Corn Steep-water Processed for Recovery of Iron Phytate—Herman H. Schopmeyer, Hammond, Ind., and Gordon V. Sharps, Chicago, Ill., to American Maize-Products Co. No. 2,313,276. March 9, 1943.

Sausage and Similar Meat Products Packaged in Casing-like Containers Made by Impregnating Paper Tube With Grease-and-gelatine-free Fibrous Mass From Animal Hides Mixed With Tragacanth—Cenek Bednar, Neu-Rausnitz, Moravia, to Alien Property Custodian. No. 2,313,289. March 9, 1943.

Starch Suspensions and Hot Water Metered Simultaneously Into Mixing Chamber for Cooking of Starch in Continuous Manner—Charles F. Payne, to Eastman Kodak Co., Rochester, N. Y. No. 2,313,574. March 9, 1943.

Fats Hydrolyzed in Continuous Multiphase Counter-current Procedure—Baruch Winer, New York, N. Y. No. 2,313,692. March 9, 1943.

Chocolate Pastes Automatically Tempered in Continuous Manner—George Jack, Rochelle Park, N. J., to J. M. Lehmann Co., Inc., New York, N. Y. No. 2,313,705. March 9, 1943.

Poultry Wings Mechanically Stripped During Dressing Operation—Joseph E. Ringrose, Redmond, Ore. No. 2,313,770. March 16, 1943.

Papaya Latex Processed for Recovery of Proteolytic Enzymes—Eugene F. Jansen, Takoma Park, Md., and Arnold K. Balls, Washington, D. C., to the people of the United States. No. 2,313,875. March 16, 1943.

Drupe Fruits Mechanically Halved and Pitted—Frank C. Silva, San Jose, Calif. No. 2,313,898. March 16, 1943.

Doughnut Batter Mechanically Extruded Through Double-acting Valve Depositor—Alexander S. T. Lagaard, to Dough-King, Inc., Minneapolis, Minn. No. 2,313,949. March 16, 1943.

Leavening Agent Comprised of Crystallized Anhydrous Calcium Acid Pyrophosphate and Monocalcium Orthophosphate in Proportions to React Slowly With Sodium Bicarbonate—Arthur E. Huff, Lemay, Mo., to Monsanto Chemical Co., St. Louis, Mo. No. 2,314,090. March 16, 1943.

Ergosterol and Similar Activatible Material Treated to Impart Antirachitic Property—Lester F. Borchardt, to General Mills, Inc., Minneapolis, Minn. No. 2,314,119. March 16, 1943.

Milk and Similar Liquids Spray-dried by Method That Supplies Drying Gas to Outer Periphery of Drying Space to Give It Cyclonic Movement—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,314,159. March 16, 1943.

Cereal Grain Germs Freed From Oil Content Without Impairment of Vitamin B Content—Ezra Levin, Chicago, Ill. No. 2,314,282. March 16, 1943.

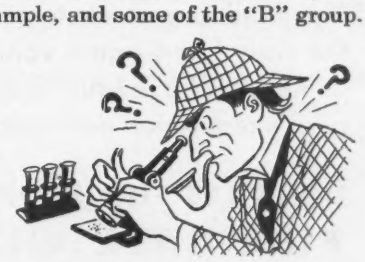
Beef and Lamb Carcasses Covered With Brine-moistened Cloth and Insulating Bag Prior to Chilling for Improvement of Flavor and Tenderness—Beverly E. Williams and Leon L. Cadwell, to Industrial Patents

The Bad Boys Are on the Spot

IN DEMOCRATIC countries, police departments nab "bad actors" and keep them out of circulation. In food processing, we also encounter "bad actors"—elements and conditions that rob products of freshness, turn them rancid, destroy their flavor. But food technologists are already on their trail. They know, for example, that they must protect food products from irradiation by light . . . exclude oxygen or excessive humidity . . . guard against insect infestation.

Recent research shows that copper and iron, even in minute traces, are "bad actors." In the manufacture of shortening, they are eliminated to increase rancidity resistance of fats and oils. They affect stability of dairy, bakery, and meat products—and practically any food that contains the slightest traces of fats or volatile flavors easily oxidized.

Yes, they even affect the stability of certain vitamins—Vitamin "C," for example, and some of the "B" group.



We have reduced the copper and iron in Diamond Crystal Salt until today they represent less than 1 part per million. Salt products in general, however, may contain significant amounts of both copper and iron.

NEED HELP? HERE IT IS!

Why not check up on the salt you are now using? And if you would like our help in keeping the "bad actors," copper and iron, down to a minimum in your plant, drop a note to our Director of Technical Service, Diamond Crystal, Dept. J-5, St. Clair, Michigan.

DIAMOND CRYSTAL
ALBERGER PROCESS **SALT**

NEXT CASE:
U. S. vs.
225 BAGS OF FLOUR

"This product was contaminated with..." But you know the story. And again valuable food supplies are condemned...the product ordered destroyed...a manufacturer's reputation damaged...a valuable customer lost.

DON'T LET THIS HAPPEN TO YOUR PRODUCT!
FUMIGATE WITH LIQUID HCN

Let us recommend an Industrial Fumigation Engineer to survey *your* insect control problem. A consultation involves no obligation —and it may save you money! His experience in dealing with infestation problems under many varied conditions enables him to advise you on the most efficient method of insect control for your plant—one which will cause a minimum of interruption of production line.

Write us for more information on this special service or for the name of the Industrial Fumigation Engineer nearest you. Your inquiry will receive prompt attention.

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Don't wait – FUMIGATE!

Corp., Chicago, Ill. No. 2,314,300. March 16, 1943.

Fresh Meat Aged Under Temperature and Humidity Control—Beverly E. Williams, to Industrial Patents Corp., Chicago, Ill. No. 2,314,301. March 16, 1943.

Natural Casings Tenderized by Controlled Enzymatic Action—Cleo A. Rinehart, to Industrial Patents Corp., Chicago, Ill. No. 2,314,313. March 16, 1943.

Drawn Poultry Quick Frozen by Injection of Cold Air Into Body Cavity—Charles T. Walter, to Industrial Patents Corp., Chicago, Ill. No. 2,314,317. March 16, 1943.

Glyceride Oils Stabilized Against Oxidative Deterioration by Addition of Small Quantity of Phosphorus Derivative and of Polyhydroxy Aromatic Compound With Subsequent Heating to More Than 250 Deg. F. Under Less Than Atmospheric Pressure—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,314,364. March 23, 1943.

Glyceride Oils Stabilized Against Oxidative Deterioration by Addition of Small Quantity of Phosphorus Compound and of Gum Guaiac With Heating to Higher Than 250 Deg. F.—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,314,365. March 23, 1943.

Milk Deodorized and Vacuum Cooled on Continuous Basis—Henry Lamont Murray, Parnell, to Murray Deodorizers, Ltd., Auckland, New Zealand. No. 2,314,455. March 23, 1943.

Starch in Water Suspension Heat Treated at 73 to 100 Deg. C. and Dried to Give Cold-swelling Starch for Blancmange and Puddings—August Adolph Salzburg, to Dryfood, Ltd., London, England. No. 2,314,459. March 23, 1943.

Pulp of Fruits and Vegetables Freed From Dust and Dirt Content by Centrifuging—Samuel Levison, Chicago, Ill. No. 2,314,586. March 23, 1943.

Glyceride Oil Mixture Purified by Mixing With Agglomerant Having Water Content, Filter Cake With Retained Oil Content, and Adsorbent Substance With Affinity for Water Content of Agglomerant to Form Coagulate Which Separates From Oil—William Kelley, to Filtrol Co. of California, Los Angeles, Calif. No. 2,314,621. March 23, 1943.

Poultry Freed of Feathers by Mechanical Device Fitted With Rubber Teeth or Projections Which Rotate at Rapid Rate of Speed—Fred Hanshaw, Port Huron, Mich. No. 2,314,700. March 23, 1943.

Pineapples Graded for Size by Mechanical Means—Kermit J. Jackson, Honolulu, Territory of Hawaii. No. 2,314,704. March 23, 1943.

Canadian Patents

Natural Cheese Packaged in Wax-rubber Film Surrounded by Outer Vented Wrapper Sufficiently Impervious to Gas to Retain Portion Evolved From Cheese During Curing But Permitting Excess to Escape—Allen Abrams, Wausau, and Charley L. Wagner, Menasha, to Marathon Paper Mills Co., Rothschild, Wis. No. 410,531. Feb. 9, 1943.

Sugar Beet Juice Treated With Calcium Oxide Produced by Calcining Recovered Lime Cake Mixed With Calcium Oxide Obtained by Calcining Lime Rock—Robert Martin Daniels, to Holly Sugar Corp., Colorado Springs, Colo. No. 410,643. Feb. 16, 1943.

Concentrated Coffee Extract With High Aromatic Content Put into Soluble Dry Form by Mixing With Carbohydrates in Equal Quanties on Dry Solid Weight Basis—Max Rudolf Morgenthaler, Vevey, Switzerland, to Inredeco, Inc., Panama City, Panama. No. 410,645. Feb. 16, 1943.

Yeast Given Increased Vitamin B_1 Content by Propagation in Wort Containing Crystalline Vitamin B_1, Growth-promoting Factors, and Pyrimidine and Thiazole Derivatives—Alfred S. Schultz and Lawrence Atkin, Bronx, N. Y., and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. Nos. 410,664; 410,665; 410,666; and 410,667. Feb. 16, 1943.

Packing House Wastes Treated for Recovery of Grease and Protein Constituents—Marion D. Sanders, to Industrial Patents Corp., Chicago, Ill. No. 410,862. March 2, 1943.

Letters to the Editor

What's Wrong with Baking

Since this letter was written, the ban on bread slicing has been lifted, making some of the writer's comments less pertinent. But the discussion of baking problems is so analytical that the writer's comments are still worth considering.—THE EDITORS.

To the Editor
of FOOD INDUSTRIES:

I was very much interested in finding two articles on the first three pages of the February FOOD INDUSTRIES referring to the baking industry. Inasmuch as my business has been in serving bakers over a 25-year period, I am happy to see that their position as a primary food industry is recognized by you to the extent of devoting considerable editorial space from time to time in discussions of their problems.

Specifically, in your two paragraphs on page 47 regarding the slicing furore, and your page 49 article on other OPA regulations, I rather sense that you have "missed the boat" on the former, but have on the whole presented a good logical case in the second article.

First, regarding the ban on slicing. I believe that facts will bear me out in the statement that while the annual per capita consumption of bread had decreased from its high point somewhere before the advent of sliced bread, it continued to decrease thereafter almost until the war began to have its effect on all food consumption. While it had its advantages in consumer service, by the admission of the majority of the bakers at its inception, it would provide this service at an additional cost which could not be realized by any price increases, because of consumer resistance and a government warning that increased bread prices were not justified under a declining flour market.

Other objections to slicing were that it would increase sales, both on the counter and in the housewife's pantry, and perhaps, save for a few over-enthusiastic proponents, few people thought that overall production would increase. As a matter of fact, universal bread slicing was forced on the baking industry as a necessary evil of competition. You may recall the hectic days when the competitive rate was for the longest loaf of bread, and the thinnest slice, which did more to reduce per capita bread consumption than any other step taken in the past two decades. It has been only since 1939 that the industry has actively tried to increase consumption by shortening the loaf and providing thicker slices.

Now I think that Senator Reed may be a bit too enthusiastic about claiming anywhere near a 20 percent increase in bread consumption by home slicing. Personally, I believe that it may increase the total breadstuff consumption, but a lot of housewives are going to become discouraged in their attempts to slice bread successfully at home, and will turn to increased use of buns, rolls, biscuits and the like.

The shortage of household bread-slicing equipment is no joke. Cutlery manufacturers who 60 years ago could fill orders within 30 days are now six months behind. Their ability to secure blade steel is, of course, limited by war priorities. Bakers are cutting their old slicer blades in half and fitting them with handles to supply their customers with proper bread slicing equipment. Hardware stores, restaurants and bakers' supply houses are besieged with requests for good bread slicing knives. And what with the increase in consumption of hamburgers, cube steaks and prepared and tenderized meats, the family carving knife just isn't what it used to be.

So much for slicing. Your article on the inability of various administration offices to correlate their regulatory efforts is indicative of more serious thought.

Primarily the administrative angle was that bread, being a basic living commodity, should be one of the foods over which the government should exercise extreme anti-inflationary control. Before the flour millers caused them to see otherwise, they felt that the flour ceiling was ample control. However, after stagnating the milling industry to the point where there was an actual shortage of flour amidst an abundance of wheat, it was necessary to shift the clamps and tighten them at another point.

Realizing that the baking industry might easily become aroused over such obvious unfair treatment, the next step was to offer an alteration of the bakers' cost structure by the elimination of slicing, twisting, double wrapping and stale returns.

Now right here I believe the bakers as a whole have been at fault in more or less emulating the farmers by hollering, not only when they are not helped but when they are. There is no question in the minds of those who look at the situation purely from the standpoint of total good to the industry

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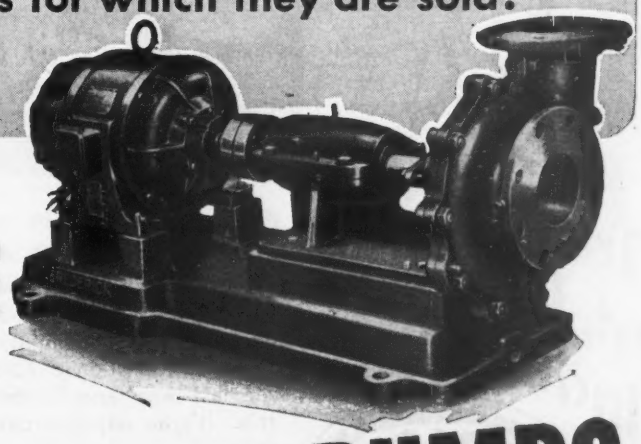

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that the government is legislating out of existence evils which the industry has grudgingly countenanced for years. The specific point which I have not yet seen advanced, and for which I will confess I do not have the figures, is this: How much in cents per pound of bread produced do the reduced costs of processing and distribution offset the increased cost of flour?

As you will recall in previous jousts with the administration, the bakers have advanced at various times the argument that (a) a decrease in flour cost is not sufficient to reduce bread prices markedly; (b) the application of the same wage-hour scale to the baking industry as to other industries would work a terrific added cost burden; (c) the cost of incidental items, such as milk, sugar, shortening, etc., has little influence on the cost per pound (and later on rising markets, and they are of more influence than flour costs). These conflicting statements and many others indicate that there has been an unfortunate lack of coordination in the baking industry, especially in its contact with political or governmental agencies.

Now, with reference to the so-called "degraded formula" which the OPA promulgates: No doubt on the basis of the high-quality bread produced by the majority of bread bakers during the years of unlimited raw material supply, this OPA standard is quite inadequate to maintain quality. However, there is a serious doubt that there will be adequate supplies in 1943, at least of milk and shortening, to provide a higher standard.

The very critical point in the OPA program, however, is not stated in your article. That is the regulation covering the sale and resale prices of all dry skim milk. This regulation allows a differential of only one cent per pound between the f.o.b. creamery price and the delivered consumer price. Heretofore, the greatest percentage of dry milk distribution to the bakers has been through distributors and jobbers who would be forced under this regulation to pay for delivery, sales cost and credit losses on a market that is normally considered insufficient to be interesting even to an f.o.b.-source basis.

As a consequence, even today many bakers are unable to secure sufficient milk (those farthest from milk processing plants suffering most) to maintain even the OPA minimum milk standard.

Far from objecting to a leaner formula, a greater number of bakers are wondering how they can legally stay in business in the face of a regulation demanding a material which is by regulation virtually unobtainable.

There is one ray of hope in all this blackness. There are other materials available which can provide most of the nutritional elements lost in the "degraded formula." Fortunately, no limitation has yet been applied to most of these. Unfortunately, however, no allowance is provided for the substitution of these items when the supply of the prescribed material is curtailed below the OPA minimum. Nor is any permission given to increase fats and sugars not otherwise limited by the use of these alternate materials.

Therefore, I think your point is well taken that OPA should have (and still should) consulted with the Defense, Health and Welfare Agency to determine what other articles may be permitted to enable the consumer to enjoy full protein, fat, sugar, mineral and good old-fashioned calories in his bread, and still provide Lend-Lease with its quota of milk and lard and sugar.—C. ALLEN HARPER, *James A. Harper Supply Co., Kansas City, Mo.*

War Industries Compete With Food Manufacturers

To the Editor
of FOOD INDUSTRIES:

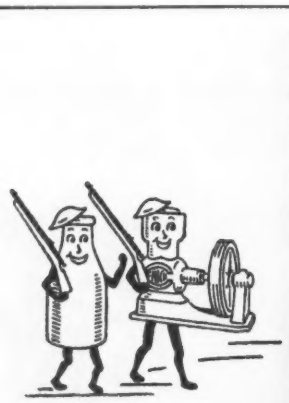
On the lower right hand corner of page 43 of your March issue you say "Food plants cannot pay the high wages of munitions factories." Just why do you say that? Do you really think that a war can be won on munitions alone or are you, too, one of those who thinks that munitions should be allowed to run wild and that the food industry should continue on a normal basis?

In Rochester, about ten miles from here, we have several "war industry plants" which are apparently operating on a cost-plus basis, the higher their cost, the greater their return. As a result of this, many, if not all, are overstaffed and many, many employees are putting in full hours and doing about half or two-thirds of what they could do.

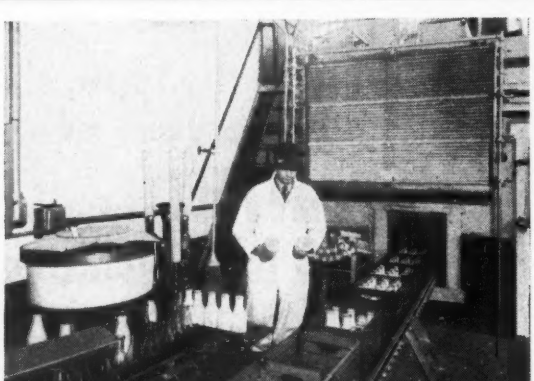
They are able to start anything that can walk at 65 cents per hour and in a very short time the 65 cents becomes 80 cents or more. There are times when they have to loaf because of a shortage of materials or some other difficulty of such nature.

It seems to us that the sensible thing to do is to insist that the munitions be produced on the same basis that farmers are expected to produce food and processors are expected to handle them.

This talk about the farmer producing food as a patriotic move is just so much trash in that he should no more be expected to prove his patriotism in that



Trusted Ally of the Food Industries—



An army fights on its stomach. So does a navy, a city, a factory, a home.

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manner than the munition manufacturer or employee should produce at a comparable rate of pay. Many farmers have gone to the munition plants during the winter and some stay there simply because they can secure a better and much easier return than anywhere else.

The one redeeming feature for the farmer is that he will have food and the city man is going to be badly pinched in the near future.

With all of the headaches in the food business and the bother with a lot of inspectors who do not know the simplest rudiments of business or food processing, we are seriously inclined to think that we would be much better off to close shop and get one of these nice jobs where we could put on our hats at quitting time and go home and forget the plant.—M. F. HALLAUER, *Webster Canning & Preserving Co., Inc., Webster, N. Y.*

How Vegetables Can Be Preserved by Brining

(*Continued from page 66*)

but a few thousand bacteria. The color, whether fermented or unfermented, had changed from green to yellow. The texture was good.

General Summary

Preliminary results show that it is inadvisable to permit any fermentation in the case of peas. It takes at least a 70-deg. sal. brine for their preservation, and an even higher salt concentration is preferable. Corn can be preserved at lower brine concentrations than peas, since it ferments much more slowly and apparently is not harmed by fermentation. Green string beans and okra can be preserved with a brine concentration starting at 40 deg. sal., with the concentration being raised 2 deg. per week until 60 deg. sal. is reached. Fermentation apparently does no harm to the beans, but okra loses color. Green lima beans require a minimum salt concentration of at least 60 deg. sal., and preferably as high as 80 deg.

In general, when fermentation occurs there is loss of color, while there is almost no change in color when fermentation is nil. Blanched vegetables ferment more readily than unblanched.

Salting does not destroy catalase or peroxidase.

Bibliography

1. F. W. Fabian and C. E. A. Winslow, The Influence upon Bacterial Viability of Various Anions in Combination with Sodium, *Journal of Bacteriology*, vol. 18, 265, 1929.

2. C. E. A. Winslow and A. F. Dolloff, Relative Importance of Additive and An-

SPOILAGE...OFF-FLAVORS...OFF-TASTES

dehydrated FOODS

MAY NOT SHOW UP UNTIL WEEKS AFTER SHIPMENT

Careful sanitary measures necessary to safe-guard quality

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tagonistic Effects of Cations Upon Bacterial Viability, *Journal of Bacteriology*, vol. 15, 67, 1928.

3. T. D. Nunheimer and F. W. Fabian, Influence of Organic Acids and Sodium Chloride upon Strains of Food Poisoning Staphylococci, *American Journal of Public Health*, vol. 30, 1040, 1940.

4. F. W. Fabian and E. A. Johnson, Experimental Work on Cucumber Fermentation. Part IX. A Bacteriological Study of the Cause of Soft Pickles, Michigan Agricultural Experiment Station Technical Bulletin No. 157, 1938.

5. C. S. Pederson and C. D. Kelly, The Quality of Commercial Sauerkraut, New York State Agricultural Experiment Station Bulletin No. 613, September, 1932.

Army Specifications For Dehydrated Foods

(*Continued from page 58*)

in the dried form and when reconstituted. Color—Shall be opaque white. Carmelization test—Dried egg whites shall not appreciably darken when heated for one hour at 100 deg. C. in a double boiler or steam bath. Texture—Spray-dried albumen shall be smooth and free from lumps that do not readily fall apart under light pressure. Reconstitution—Shall be readily and quickly reconstituted with water, and shall produce a smooth mixture. Dried albumen shall also retain the whipping qualities of the fresh product in accordance with the following tests: 1½ oz. of dried albumen, when dissolved in 15 oz. of water at 70 deg. F. and beaten in a Hobart electric whipper, or other equivalent whippers, for 90 seconds in second speed, and 90 seconds in third speed, shall produce a foam which, when leveled, fills the 10-quart bowl of the Hobart whipper, or other equivalent whipper, to a uniform depth of not less than 5-½ in.

Type III, Class A. Spray-dried egg yolk—The product shall be spray dried, and, in addition, shall comply with the following requirements within 72 hours from the time that the finished product is removed from the drier.

Moisture—Shall not exceed 5 percent. Fat—Shall be not less than 57 percent as measured by the acid hydrolysis method. Standard bacterial plate count—(a) Shall not exceed 150,000 per gram. The plating medium shall be standard nutrient agar and the plates shall be incubated at 37 deg. C. for 48 hours. (b) Coliform organisms shall not exceed 100 per gram when examined under methods prescribed in the "Standard Methods for Examination of Dairy Products," American Public Health Association, 1941. (c) Yeast and mold count shall not exceed 100 cells per gram, respectively, when incubated on potato dextrose agar at 32 deg. C. for 48 hours. The agar shall be adjusted with tartaric acid at the time of pouring to pH 3.5, plus or minus 0.1.

Odor and flavor—Shall have a sweet wholesome egg-yolk odor and flavor, both in the dried form and when reconstituted. Color—Shall be uniformly golden yellow. Texture—Shall be smooth and free from lumps that do not readily fall apart under light pressure. Reconstitution—Shall be readily and quickly reconstituted with cold water, and shall produce a smooth mixture simulating liquid yolk consistency.

Inspection and Tests

Inspection shall be made at point of origin unless otherwise specified in the invitation for bids. Unless otherwise specified, chemical analyses, if required, shall be made in accordance with methods of the Association of Official Agricultural Chemists, in effect on date of invitation for bids. Unless otherwise specified, bacteriological analyses, if required, shall be made in accordance with the methods prescribed in the "Standard Methods for the Examination of Dairy Products," American Public Health Association, in effect on date of invitation for bids.

Packaging

Packaging—Unless otherwise specified, 2-½, 3, 3-½ or 4 lb. (the maximum quantity the can will accommodate) of Types I, II and III shall be packaged in a No. 10 or a 5-qt. hermetically sealed sanitary metal can. The cans shall be of the following construction: The body shall be of electrolytic tinplate and the ends of the same or of chemically treated plate, either plate being not less than 107 lb. per base box. The body seam shall be soldered and the top and bottom shall be compounded and double seamed on the can. The can shall be protected on its outside surfaces with a suitable corrosion-resistant lacquer. If the ends are made of chemically treated plate, then the inside of the ends shall be similarly lacquered.

Labeling—Unless otherwise specified, one end of the can shall be lithographed with the following information: Manufacturer's name and address; name and type of product; net weight in pounds; "Keep cool and dry;" "To prepare for use, add to luke warm water and mix;" "Use within 30 minutes." "Contents of this can plus W quarts of water will furnish the equivalent of X whole eggs" (or Y whites or Z yolks as the case may be). The quantities W and X (or Y or Z) shall be determined and specified by the packer. The month and year of packing.

Packing—Unless otherwise specified, the product shall be packed six cans to the case in fiber boxes type VSS complying with Quartermaster Corps Tentative Specification, OQMG No. 93. B flute corrugated test liners shall be placed between cans and on the top and bottom and ends and sides of the case. The cases shall be tightly strapped in compliance with Quartermaster Corps Tentative Specification, OQMG No. 12-A.

Dehydrated Cheese

The following specifications, of the issue in effect on date of invitation for bids, shall form a part of this specification:

Federal Specification C-C-271, "Cheese; American (Cheddar or American Cheddar) and Process American."

Tentative U. S. Army Specification No. 22–42, "Supplies, Subsistence, for the

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United States Army, Conditions Governing the Purchase of."

U. S. Army Specification No. 100–2, "Standard Specifications for Marking Shipments."

Quartermaster Corps Tentative Specification OQMG No. 12-A, "Packing for Overseas Shipments."

Material and Workmanship

The natural cheese used in the manufacture of this product shall meet the requirements of Type I, Federal Specification C-C-271. In addition to complying with Federal Specification C-C-271, the cheese used shall have a weighted average age of four months.

This product shall be prepared under strictly sanitary conditions and in accordance with standard commercial practice.

Detail Requirements

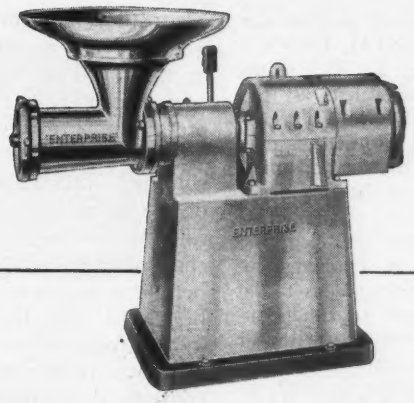
In the preparation of this product not more than 3 percent of a suitable emulsifier and not more than 1¼ percent of salt may be added. Artificial color may be added to produce the desired color in the finished product. The finished product shall have a moisture content of not more than 4 percent and a minimum fat content of 48½ percent. The cheese powder shall be pressed into bars of approximately 5 oz. net weight. Each bar shall be scored in such a way that it can be easily broken into four equal parts.

Inspection and Tests

Unless otherwise specified, inspection for compliance with this specification shall be made at the point of origin, during the process of manufacture and packing. Product inspected at origin will be subjected to inspection at destination for condition only. Otherwise, inspection will be made at the point of delivery. Chemical analyses, if required by the purchaser in the examination or testing of samples and deliveries under this specification, shall be made in accordance with methods of the Association of Official Agricultural Chemists, in effect on date of invitation for bids.

Packaging

Packaging—Each brick of the product shall be dipped into molten fully refined paraffin having a melting point of not less than 132 deg. F. (ASTM, D87–37) so as to cover it with a continuous film about 0.025 in. thick. The wax-coated brick shall then be placed in a folding board carton made from board containing no waste fibrous raw material. The board shall have kraft or khaki-colored, or drab gray, outer surfaces. The board shall be free from odor and shall be at least 0.020 in. thick, unless made from solid kraft or sulphite, when it shall be at least 0.0.15 in. thick, and shall bear a glassine liner having a basis weight of at least 20 lb. (24"x36"—500). This glassine liner for the interior of the carton shall have a grease resistance of over 600 seconds (TAPPI, T454M-42). The closures on the carton shall be made so as not to allow powdered material to sift. After gluing, the carton shall be overwrapped with a single sheet of unbleached waxed paper of good quality, preferably kraft, having a basis weight of not less than 25 lb. (24"x36"—500) coated with at least



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8 lb. per ream of fully refined paraffin wax having a melting point (ASTM, D87–37) of not less than 132 deg. F. The seams and closures shall be heat sealed. If the waxed paper wrapper is sufficiently transparent, the required labeling information may be printed on the side of the carton; otherwise, it shall be printed on the outside of the wrapper.

Packing—Unless otherwise specified, the packages shall be packed in standard commercial containers, so constructed as to insure acceptance by common or other carriers, for safe transportation, at the lowest rate, to the point of delivery.

Marking—Unless otherwise specified, all cases shall be stenciled or printed as follows: Number of units, name of product, date (month and year) of packing, contract number, name and address of manufacturer.

Concentrating Citrus Juices by Vacuum

(Continued from page 64)

sible from condensers in which they are mixed with condensing water. The esters might be recovered in a surface condenser attached to a small single-pass evaporator inserted between the juice pasteurizer and the vacuum pan, using the heat of the liquid to effect the evaporation.

Until some development permits the return of volatile juice constituents, the flavor of citrus concentrates can best be improved by adding small amounts (e.g., much less than 1 percent) of cold-pressed peel oil concentrated under a high vacuum to one-third of its original volume. The least stable constituents of the oil are thus distilled off, and are sold in the trade as "terpenes." The concentrated cold-pressed oil remaining behind is improved in stability and may be mixed with the citrus concentrates in the form of an alcholic solution or emulsion immediately before the concentrate is removed from the vacuum pan.

Part II of this article will be published in FOOD INDUSTRIES *for June, 1943.*

References

1. J. L. Heid and W. C. Scott, *Fruit Products Journal*, vol. 16, 136, 1937.
2. ———— , *Fruit Products Journal*, vol. 17, 100, 1937.
3. J. W. Stevens, and W. E. Baier, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 2, 447, 1939.
4. J. W. Stevens, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 10, 269, 1938.
5. R. R. Musulin and C. G. King, *Journal of Biological Chemistry*, vol. 116, 409, 1936.
6. O. A. Bessey, *Journal of Biological Chemistry*, vol. 126, 771, 1938.
7. Morrell, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 13, 793, 1941.
8. T. A. Bruce, U. S. Patent No. 2, 147, 238.

Collateral Reading

1. J. H. Irish, Fruit Juice Concentrates, California Agricultural Experiment Station Bulletin 392 (revised), 1931.
2. H. D. Poore, Apple Juices, Concentrates and Sirups, *Fruit Products Journal*, vol. 14, 170 and 201, 1931.
3. W. V. Cruess, "Commercial Fruit and Vegetable Products," 2nd Edition, McGraw-Hill Book Co., New York, 1938.
4. D. K. Tressler, M. A. Joslyn and G. L. Marsh, "Fruit and Vegetable Juices," Avi Publishing Co., New York, 1939.
5. E. M. Chace, H. W. von Loesecke and J. L. Heid, Citrus Fruit Products, U. S. Department of Agriculture Circular No. 577, 1940.
6. H. W. von Loesecke, "Outlines of Food Technology," Reinhold Publishing Corp., New York, 1942.
7. A. Sedky, C. R. Fellers and W. B. Esselen, An Improved Orange Concentrate, *Fruit Products Journal*, vol. 21, 136, 1942.

Controlled Atmosphere Storage of Fruits

(Continued from page 72)

the low oxygen and high carbon dioxide are not suited to human respiration. The room must be loaded, left until it is desired to market the entire contents, and then ventilated before being unloaded.

With apples, particularly certain varieties, such as McIntosh and Jonathan, controlled atmosphere storage has had marked beneficial effects upon keeping quality. With pears, equally fine results have been achieved. However, the results with stone fruits, with the exception possibly of cherries, do not, from present information, warrant the additional expense of controlled atmosphere storage. Whether or not it will pay to ship cherries and berries to distant markets in atmospheres containing carbon dioxide supplied by the addition of dry ice to the refrigerator cars will depend upon the availability of suitable cars, reduction in wastage from rots and the appearance of the fruits on arrival. Work with citrus fruits has not progressed far enough to evaluate results.

References

1. F. W. Allen and L. R. McKinnon, Storage of Yellow Newtown Apples in Chambers Supplied with Artificial Atmospheres, *Proceedings of American Society of Horticultural Science*, vol. 32, 146-152, 1934.
2. F. W. Allen and R. M. Smock, Carbon Dioxide Storage of Apples, Pears, Plums, and Peaches, *Proceedings of American Society of Horticultural Science*, vol. 35, 193-199, 1937.
3. F. W. Allen, Carbon Dioxide Investigations: Influence of Carbon Dioxide Atmospheres upon Cherries, Plums, Peaches, and Pears under Simulated Transit Conditions, *Proceedings of American Society of Horticultural Science*, vol. 37, 467–472, 1939.
4. D. V. Fisher and J. E. Britton, Maturity and Storage Studies with Peaches, *Scientific Agriculture*, vol. 21, 1-17, 1940.
5. D. V. Fisher, Mealiness and Quality in Delicious Apples as Affected by Certain Orchard Conditions and Storage Technics,

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Vilter Award for outstanding Achievement in War Production.

Proceedings of American Society of Horticultural Science, vol. 40, 128-132, 1942.

6. F. Gerhardt and B. D. Ezell, Effect of Carbon Dioxide on Bartlett Pears under Simulated Transit Conditions, *Journal of Agricultural Research*, vol. 56, 121-136, 1938.
7. F. Gerhardt, A. L. Ryall, E. Smith and E. D. Millison, The Use of Solid CO_2 as a Refrigerant and as a Source of Gas to Supplement Standard Refrigeration in the Transportation of Sweet Cherries, H. T. & S. Office, Report 51, United States Department of Agriculture, 1940.
8. F. Gerhardt, E. Smith and H. English, Effect of Carbon Dioxide on Apricots and Peaches under Simulated Transit Conditions, *Proceedings of American Society of Horticultural Science*, vol. 38, 243-248, 1941.
9. F. E. Huelin, J. B. Tindale and S. A. Trout, The Cool Storage of Peaches: In Air and Artificial Atmospheres, *Journal of the Department of Agriculture*, Victoria, Australia, vol. 35, No. 12, 1937.
10. F. Kidd, C. West and M. N. Kido, Gas Storage of Fruit, Department of Scientific and Industrial Research, Food Investigation, Special Report 30, 1927.
11. F. Kidd and C. West, Gas Storage of Fruit. III. Lane's Prince Albert Apples, *Journal of Pomology and Horticultural Science*, vol. 11, 1933.
12. W. R. Phillips, The Application of Controlled Atmospheres in the Storage of Fruits, *Scientific Agriculture*, vol. 19, 66-68, 1938.
13. W. R. Phillips, Gas Storage, Dominion of Canada Department of Agriculture, Publication 670, Circular 149, December, 1939.
14. H. H. Plagge, Controlled Atmosphere Storage for Jonathan Apples, *Refrigerating Engineering*, vol. 43, 215-220, 1942.
15. A. L. Ryall, Certain Physiological Effects of CO_2 Treatment of Plums, *Proceedings of American Society of Horticultural Science*, vol. 32, 164-169, 1934.
16. A. L. Ryall, CO_2 Aids in Keeping Cherries, *Better Fruit*, vol. 20, No. 3, September, 1935.
17. R. M. Samisch, Observations on the Effects of Gas Storage upon Valencia Oranges, *Proceedings of American Society of Horticultural Science*, vol. 34, 103-106, 1936.
18. E. F. Smith, F. Gerhardt and W. H. English, Report on a Transportation Test with Sweet Cherries in Refrigerator Cars: Influence of the Height of the Load. Mechanical Circulation of Air, and the Use of Carbon Dioxide as a Supplement to Standard Refrigeration. United States Department of Agriculture, H. T. & S., Office Report, No. 92, 1942.
19. R. M. Smock and A. Van Doren, Studies with Modified Atmosphere Storage of Apples, *Refrigerating Engineering*, vol. 38, No. 3, September, 1939.
20. R. M. Smock and A. Van Doren, Controlled-Atmosphere Storage of Apples, Agricultural Experiment Station, New York, Bulletin 316, 1941.
21. A. L. Stahl and J. C. Cain, Cold Storage Studies of Florida Citrus Fruits, Florida Agricultural Experiment Station, Bulletin 316, 1937.
22. J. H. L. Truscott, The Handling and Storage of Bartlett Pears Grown in the Niagara Peninsula, Mimeos from Ontario Agricultural College, 1940.
23. A. Van Doren, M. B. Hoffman and R. M. Smock, Carbon Dioxide Treatment of Strawberries and Cherries in Transit and Storage, *Proceedings of American Society of Horticultural Science*, vol. 38, 231-238, 1941.
24. J. D. Winter, R. H. Landon, A. C. Vogele and W. H. Alderman. The Carbon Dioxide Treatment of Raspberries and Strawberries, *Proceedings of American Society of Horticultural Science*, vol. 35, 88-192, 1937.
25. J. D. Winter, R. H. Landon and W. H. Alderman, Use of CO_2 to Retard the Development of Decay in Strawberries and Raspberries, *Proceedings of American Society of Horticultural Science*, vol. 37, 583-588, 1939.

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Cleaner Water—Purer Foods

Today your facilities are under heavy strain. Let FILTRINE help by removing *completely* all rust, sand, clay, vegetable and other suspended matter from your water lines. This is a valuable aid today, when most sources of water supply are doing double duty.

FILTRINE is inexpensive, too—it lasts a lifetime. When saturated, the filter medium can be replaced in a matter of minutes.

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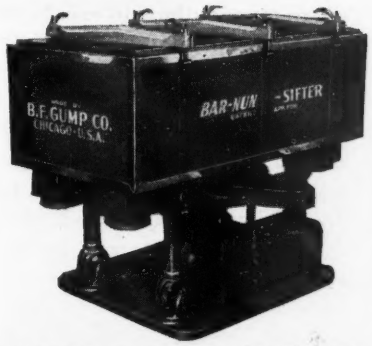

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War plants processing vital materials have proved the ability of BAR-NUN Rotary Sifters to deliver thorough, uniform separations. They'll operate day in and day out on 24-hour duty, with minimum attention and maintenance cost. Based on actual performance, plant after plant has ordered additional BAR-NUNS to keep pace with expanding operations. These precision-built ROTARY Sifters are made in 9 sizes, 4 to 60 sq. feet of cloth surface.

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Questions and Answers

Formula for Frozen Baked Pork and Beans

New Jersey—"We are contemplating adding 'Baked Beans' or 'Pork and Beans' to our line of frozen products. Receipt of any recipes, formulas, or other data on these products that you may have available shall be greatly appreciated."

In reply to this and similar inquiries, we are publishing in this issue, on page 131, the complete formula and manufacturing directions developed as a result of recent research work at the Western Regional Laboratory, U. S. Department of Agriculture, Albany, Calif.

Citric Acid Substitute

Illinois—"We notice that some firms are producing a substitute for citric acid, and we would like very much to secure a formula, also names of the suppliers of the ingredients necessary to produce this item."

This question probably refers to the use of levulinic acid, which has been marketed in a very limited way as a substitute for citric. The firm which supplied this acid has limited equipment for its production and has been unable to meet the heavy demand for this product. We do not know of another producer of levulinic acid.

Pickle Containers

Massachusetts—"I use second-hand wooden 5-gal. kegs for pickles with vinegar. Do you know of any other package, made from waxed cardboard or plastic, that could be used? I use quite a number of them, but they must be reasonable in price as pickles do not bring big prices."

The only material except wood or glass which has been used at all for pickles is Pliofilm, and use of this material is restricted entirely to government requirements.

Plastics, even if available, would be too expensive. One difficulty with paper or cardboard would be in providing a satisfactory seal.

You should be able to get a supply of wooden kegs, such as you have been using. Under the WPB Preference Rating Order P-140, which covers such containers, pickled foods packed in 5-gal. containers or larger have a preference rating of AA-3.

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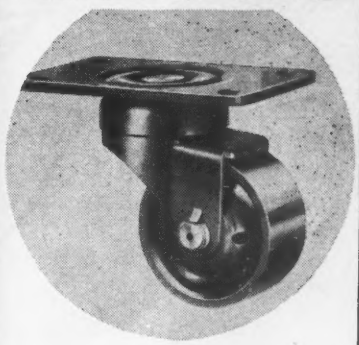

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To get your product in the nation's market basket today ...YOU NEED HIGH VITAMIN VALUES!

"The day will surely come when every food manufacturer will have his products literally picked apart, point by point, in determining their right to a place in the family market basket."

(FOOD MATERIALS "Guide to Enrichment", November, 1942)

That day has already arrived!

Right now there are two kinds of currency being used in buying many food products—money and points. And as your own wife can tell you, *points are by far the most important!*

As a result, America's housewives are shrewdly insisting on getting maximum nutritional value for each precious point they have.

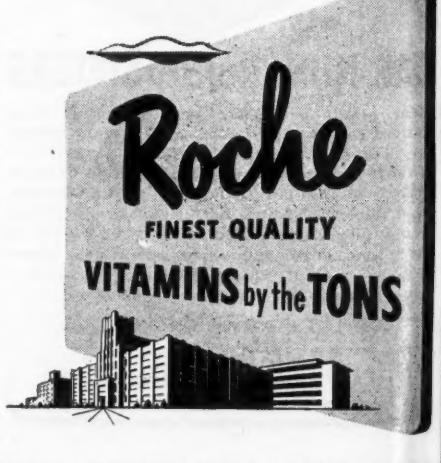
No more haphazard buying on the home front! And none when Uncle Sam buys for the boys on the battle front. Today your products must justify their right to a place in the rationed family market basket . . . must justify their right to precious cargo space. And when the decisions are made, the word "Enriched" has a truly amazing effect—for everyone knows that "Enriched" means *improved!*

If your products don't measure up in vitamins—if they have lost vitamins in processing—somebody else's "Enriched" products may crowd yours out.

So give serious thought to enriching. Find out today which of your products, in the opinion of nutritional authorities, should be enriched. Then with vitamin enriching costs down to a mere fraction of what they used to be, go ahead and give your products the soundest possible nutritional foundation.

Do this not only to safeguard your present sales, but also to insure your after-the-war position.

Let us give you the latest technical information on how to enrich, the new low costs and the many benefits. We pioneered in vitamins and today are furnishing a goodly percentage of the nation's vitamin B_1, B_2 and C requirements. Write for these latest sales enriching facts today. Hoffmann-La Roche, Inc., Vitamin Division, Roche Park, Nutley, New Jersey.



FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

ENGINEERING

Peanut Grinding

By a recently patented process peanuts are comminuted to a uniformly fine butter with a minimum amount of cell rupture, being held by a water-cooled sleeve against the outer surface of a hollow cylinder covered with a fine-mesh wire cloth, revolving at a surface speed of 4 to 8 ft. per second. The fine particles pass through the screen and the butter is removed continuously from one end of the hollow cylinder.

This butter is claimed to be smoother in texture, easier to digest and less subject to rancidity, because the cells are not ruptured. It requires no stabilizer and retains a pure nutty flavor longer than any other commercial unstabilized peanut butter.

Digest from U. S. Patent 2,307,398, issued January 5, 1943, to G. A. Fisher, and assigned to William S. Scull Co., Camden, N. J.

Spray Drying

Recent patents cover engineering improvements increasing the capacity and thermal efficiency of spray-drying processes.

Materials containing proteins susceptible to coagulation by heat are dried in a multistage system wherein a spray drier is operated so as to reduce the substance to a solid but not to dry it completely, and a succeeding stage consists of a cyclone drier operated at a lower temperature, with addition of dry heated air, so that the solid particles from the first stage are subjected to the drying gas at a higher velocity and at a much lower relative humidity. The system further comprises the usual classifiers and separators. The partially dried solid particles from the first stage are conveyed directly to the second stage, without intervening rest. The feed for the spray drier may be vacuum concentrated. Advantages claimed are a greatly increased capacity for a spray drier of a given volume and a product which is more soluble and not discolored, loss of solubility and discoloration in the usual operation being due to heat coagulation of the proteins.

In an illustration skim milk is dried to 4 to 10 percent moisture in the first stage with an air inlet temperature of 260 deg. F. and an outlet temperature of 170 deg. F. Additional dry air for the second drier has a temperature of 220 deg. F., while the outlet temperature from the classifier is 150 deg. F. and the air is not saturated. The product may have 0.5 to 3 percent moisture as desired.

A second patent to the same patentee introduces into the drying system a heat exchanger which maintains a partial vacuum on the material being evaporated and preheats incoming liquid, the preheated liquid then being used to wash out any powder carried over in the exhaust from the spray drier before it is subjected to vacuum concentration. The vacuum concentrate is then fed to the spray drier.

Digest of U. S. Patents 2,310,650, issued Feb. 9, 1943, and 2,312,474, issued March 2, 1943, both to David D. Peebles, and assigned to Golden State Co., Ltd., San Francisco, Calif.

MEATS

Effect of pH of Pickle On Color of Cured Pork

Color development in cured pork is influenced sharply by the pH of the product. With pH below 5 it is impossible to obtain proper color fixation; the meat becomes less tender with decreasing pH, moisture loss or shrink increases and the flavor is undesirable or sour. A pH in the range of 5.2 to 6 seems optimum for normal color fixation and for tender and palatable meat. The range from pH 6 to 7 gives normal color but the meat becomes undesirably soft in some cases. The neutral range is further undesirable because of the likelihood of the development of proteolytic bacteria. Above pH 7.5 or 8 the meat is almost gelatinous after 2 or 3 days curing.

The pH affects color fixation by influencing the rate of the nitrite-myohemoglobin reaction. It is nitric oxide myohemoglobin which gives a good red color.

In a laboratory method of curing to eliminate unknown factors, using small cubes of pork, microorganisms are controlled by sterilization under a germicidal lamp, the pickle is made with C.P. salts and distilled water, and the pickling solution is strong enough to give a cure in 24 hours at low temperature. Curing of pork normally occurs at pH 5.6 to 5.7, due to the buffering action of the pork. Buffered solutions were used to obtain a pH range from 4.4 to 9, the buffer salts being without any specific influence on the color developed.

Digest from "Relation of Hydrogen-ion Concentration to Color Developed in Cured Pork," by P. C. Duisberg and R. C. Miller, *Food Research*, vol. 8, 78-87, January, 1943.

STABILIZERS

Gum Guaiac Stabilizer

In the use of gum guaiac as a stabilizer for fats and oils as covered by U. S. Patent 1,903,126, considerable difficulty has been encountered in securing the necessary dispersion of the stabilizer in the fatty product. A recent patent discloses that addition of the stabilizer may be facilitated by use of a volatile fatty acid as a carrier, since gum guaiac is soluble in the lower fatty acids such as acetic, propionic, butyric, caproic and caprylic. Acetic is preferred for this purpose. The fatty acid can be removed by steam distillation at temperatures below that at which decomposition of the fat occurs, and will be so removed if steam deodorization is done after incorporation of the dissolved stabilizer.

Digest of U. S. Patent 2,308,912, issued Jan. 19, 1943, to J. L. Doegey, and assigned to Industrial Patents Corp., Chicago, Ill.

Aging Temperature For Ice Cream Mixes

This study was undertaken to find an explanation for the increased efficiency of gelatine in ice cream mixes. It had been observed that when mixes containing gelatine were initially aged at 68 deg. F. for 4 to 6 hours the product was smoother than when aged at 38 deg. F. for the entire holding time. Or the gelatine could be reduced approximately one-fourth without impairing the quality of the product. If there was no recontamination after pasteurization, the higher aging temperature did not increase the bacterial count.

Physical determinations, such as optical rotation, Tyndall effect and gold number, and studies of the effect of agitation while aging, indicate that the higher initial aging temperature results in a more closely knit structure, consisting of many more interconnected

The Imitation COCONUT with the NATURAL COCONUT FLAVOR

Coconut is a notoriously hard flavor to duplicate, but the MM&R laboratories turned the trick with IMITATION COCONUT FLAVOR MM&R.

This remarkably fine product has both the aroma and flavor of real coconut, and users have been quick to tell us it's ideal for icings, fillings and other purposes where a true coconut flavor is desired.

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filaments. This occurs because the gel-structure building takes place at a temperature where viscosity is not sufficient to interfere, but which is low enough so that there is sufficient gel modification present. Tests on gelatine solutions indicate that the optimum temperature is approximately 68 deg. F.

Digest from "An Explanation of the Increased Efficiency of Gelatin in Ice Cream Mix When Initially Aged at 68° F.," by W. S. Mueller, *Journal of Dairy Science*, vol. 26, 189-203, February, 1943.

CANNING

Staphylococcus In Processed Foods

CANS of ten products selected to cover a range of acidity were inoculated with *Staphylococcus aureus*, then the cans were resealed and incubated for periods up to 60 days at 71.6 and at 98.6 deg. F.

There appears to be a direct correlation between pH and growth of staphylococci. No growth occurred in the acid foods, represented by tomato juice and peaches. There was some growth with the semi-acid products, asparagus, spinach and string beans. Growth occurred in the low-acid groups, both beans and corn and the shellfish, shrimp and salmon.

Growth was greater in those cans incubated at 71.6 deg. F. than in the ones held at 98.6 deg. F. In the case of peas and corn, gas was evolved, consisting principally of carbon dioxide and nitrogen, with some hydrogen and oxygen. This was unexpected, since staphylococci ferment the common laboratory sugars with production of acid only. The inoculation technic was such that there was no secondary contamination.

Digest from "Growth of a Food-Poisoning Strain of Staphylococcus Experimentally Inoculated into Canned Foods," by M. Segalove, E. Davison and G. M. Dack, *Food Research*, vol. 8, 54-57, January, 1943.

VITAMINS

Azotobacter Production

AZOTOBACTER cells grown in a nitrogen-free medium comprising sucrose and mineral salts have a vitamin content equal to or greater than that of brewer's yeast. Biotin, thiamin and pantothenic acid are higher when the cells are grown in a molasses medium, but nicotinic acid and riboflavin are somewhat lower.

Fermentation experiments were carried out on a semi-plant scale, using a 200-gal. yeast fermenter. About 15 percent of the total sugar consumed was recovered in dry weight of the cells. This is good in view of the fact that, in the nitrogen-free medium used, the nitrogen supply was obtained from the air and energy for its fixation must be furnished by the carbon source in the medium.

Yeast grown under optimum conditions in grain wort with rapid aeration, will give yields as high as 30 percent dry yeast from the sugar used, but the efficiency of the azotobacter process may be increased when optimum conditions for it have been established through further study.

Digest from "Large-Scale Production of Azotobacter," by S. B. Lee and R. H. Burris, *Industrial and Engineering Chemistry*, vol. 35, 354-57, March, 1943.

BEVERAGES

Acidulated Juices

SAUERKRAUT juice with a pH of 2.18, containing one part acetic acid to about four of lactic acid, was found satisfactory in acidifying blends of less acid vegetable juices. The flavor was in all cases better than with hydrochloric, lactic, acetic or phosphoric acids. The same type of curves are obtained for the addition of an acid to each of the vegetable juices to bring the blend to a desired pH, the difference being only in the amount required in each case.

The vegetables should be macerated and extracted, then the juice blended and processed immediately. A satisfactory process is to blend to pH 4, deaerate at 14 to 16 mm., flash pasteurize at 180 deg. F. and fill into cans or heated bottles.

Beet, onion and white turnip give a pleasing flavor, but can be used only in small amounts in blends. Rutabaga is strong flavored, red cabbage flat and tasteless. Celery and carrot are good. Any of these juices, except rutabaga and cabbage, blend well with tomato juice, preferably using about two-thirds tomato juice in the final blend.

Digest from "Acidified Vegetable Juice Blends," by H. G. Beattie and C. S. Pederson, *Food Research*, vol. 8, 45-53, January, 1943.

CEREALS

Grain Storage

GRAIN in storage will first undergo deterioration, with growth of fungi and development of heat, in small patches in the wetter portion of the bulk. Heating may spread throughout the stored grain or sufficient taint may be developed in small areas to make the grain unfit for milling. The storage life of a bulk of grain depends on the maxi-

mum water content at any point, rather than on the average moisture of the entire mass. To reduce the water content and increase uniformity without handling the entire bulk through the driers, an automatic method has been developed which will separate the drier fraction that will have a longer normal storage life from the wetter portion, which may then be dried separately.

Grain passes in a stream of constant thickness between two metal plates acting as a condenser. An alternating potential of constant frequency is applied to one plate and the other plate is grounded. The current controls the separating mechanism, passing the grain to one or another of two chutes. The precision obtained is adequate for the purpose.

Digest from "Automatic Separation of Wet from Dry Grain for Storage," by T. A. Oxley and F. Y. Henderson, *Nature*, vol. 151, 223, Feb. 20, 1943.

FUMIGATION

Residual Bromide In Dairy Products

Methyl bromide fumigation is suitable for dairy products. The bromide is toxic to all forms of insect life, including cheese mite (*Tyroglyphus siro*) and cheese skipper (*Piophila casei*), weevils and roaches, and their eggs. It is effective at low temperature whereas many other fumigants become ineffective when the temperature drops. Because of its penetrating power it can be used satisfactorily in vaults, coolers, curing rooms, warehouses or factories tight enough to confine gas. No off-tastes or odors were found in dairy products inspected.

Cheese, dried skim milk, butter and oleomargarine were fumigated under warehouse conditions. It was found that the bromide does not penetrate much beyond the outer quarter-inch in cheese and butter, and that all of the absorbed methyl bromide has been lost, either by volatilization or by conversion into inorganic bromide, within two or three days after removal from the fumigation chamber. The bromide does penetrate any crack or opening communicating to the air, but the residual bromide will be about the same in the interior in this case as on the outside.

There is an ample margin of safety between known safe dosages of bromide and the maximum possible intake though eating fumigated foods.

Digest from "The Fumigation of Dairy Products With Methyl Bromide," by L. S. Roehm, V. A. Stenger and S. A. Shrader, *Journal of Dairy Science*, vol. 26, 205–11, February, 1943.

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Use dependable OAKITE MATERIALS TO CLEAN all your processing equipment!

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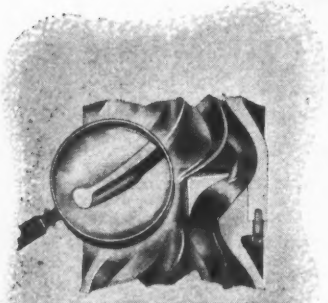


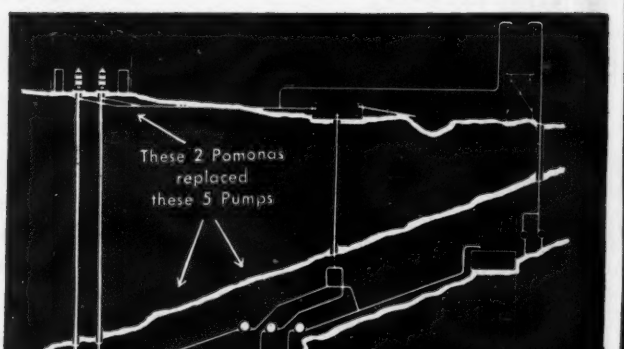
BULBOUS VANED BOWLS! This outstanding Pomona Pump development has lifted the already high Pomona efficiencies to a new peak . . . *in some cases above 90%* . . . reducing power requirements to a record low. The bulbous end shape smooths out fluid flow, minimizing turbulence, eddy currents and resultant skin friction. Result — more power goes into actual water pumping!

Bulbous vaned bowls are a recent Pomona advancement, and older Pomona Pumps can be re-bowled with this power-conserving feature. However, to save metals, get as much service as possible from your present bowl assemblies before having them changed for the new bulbous-vaned type!

ADJUSTMENT FOR CAPACITY! Here's another vital power-conserving feature that no other pump provides—ability to adjust the capacity to your exact needs *without wasteful throttling*. Unlike conventional pump impellers, Pomona's semi-open impellers can be raised or lowered on their seats to give the exact flow desired, *with proportionate savings in power*. And this adjustment can be quickly made *at the surface* with minimum effort. Raising the impeller gives more clearance between blades and seat—pumping less water and, at the same time, reducing the operating power required.

RESULT—power consumption is proportionate to amount of water pumped.

Contrast this with the valve-throttling necessary in other type pumps to adjust pump flow. Throttling increases the pressure the pump must work against—*increases* the power required in proportion to flow.



ONE POMONA CAN REPLACE SEVERAL PUMPS— Often a single Pomona Pump will do the job now requiring *several* other-type pumps . . . will do it *better*, with considerably *less* power. Typical is the Pomona installation diagrammed above where two Pomonas replaced FIVE horizontal pumps on a dewatering job. The Pomonas not only eliminated excessive piping and power cables, but did the job on 400 h.p., whereas the 5 pump arrangement had required 675 h.p.—*67% more!* Compare the *power costs*—$19,936 per year with the five-pump set-up . . . $10,750 per year—about HALF—with the Pomonas!

Call in your nearest Pomona representative and have him check over your pumping installation. Perhaps he can help you take fuller advantage of the *many* — and varied — savings incorporated in Pomona Pumps. You'll save power, save money, save maintenance . . . *and save resources vital to our war production!*

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FORMULAS FOR FOODS

FORMULA NO. 403

Norwegian Sweet Bologna

Beef trimmings	30 lb.
Boneless chucks	30 lb.
Pork trimmings	40 lb.
Dry milk solids*	4 lb. 8 oz.
Dried seedless raisins	3 lb.
Salt	3 lb. 4 oz.
Invert sugar	3 oz.
White pepper	5 oz.
Onion powder	1 oz.

*Not over 1¼ percent fat.

Directions

Grind the beef and pork separately through a ¼-in. plate. Wash the raisins in cold water until clean. Put the beef in a silent cutter, and add the salt and invert sugar, shaved iced and dry milk solids. Chop for five minutes, then add the pork and spices. When the mixture is fine enough, add the raisins and chop for 2 or 3 revolutions. Add enough ice during the chopping period to make a mixture of the right consistency; the mix should be chopped to about the same fineness as regular bologna.

Stuff the mixture in 1-⅞x20-in. cellulose casings or wide beef middles. Hang in the smokehouse and smoke for 2 to 2½ hours at 120 to 160 deg. F. Cook at 160 deg. F. for 45 to 60 minutes, depending on the diameter of the casing.

Place under cold shower or immerse in cold water for about 10 minutes. Enough heat should be left in the sausage so it will dry itself.

Strained honey may also be used in this bologna instead of raisins. When honey is used, heat 1½ lb. of honey so that it will run freely when poured. Pour it evenly over the meat just before the chopping process is completed.

Formula from American Dry Milk Institute.

FORMULA NO. 404

Quick Frozen Baked Pork and Beans

Satisfactory frozen pork and beans of the tomato-sauce type have been prepared in the Western Regional Research Laboratory using the following formula, which is a modification of the one given for the canned product in the Quartermasters' Specifications (QMD No. 51, Amendment 1, June 19, 1942).

The yield will be about 1,775 one-pound packages.

Equipment: Steam or water blancher, vats for soaking the beans, retort, kettle (preferably jacketed) and packaging equipment.

Ingredients

Beans	415 lb.
Tomato puree (1.035 sp. gr. basis)	270 lb.
Sugar	47 lb.
Salt	17½ lb.
Onions, fresh, ground	6 lb.
Allspice, whole	6 oz.
Cinnamon, whole	7 oz.
Clove, whole	6 oz.
Mace, whole	4 oz.
Fat from cooked pork	
Cornstarch	11¾ lb.
Citrus pectin, slow set (100 grade basis)	2 lb.
Water to make total of 900 lb. (100 gal.)*	
Pork, trimmed	56 lb.

*Add 48-gal. (400 lb.) before cooking, then make up to volume after cooking.

Procedure

Blanch small white beans for 4 minutes at 170 deg. F., soak in soft, cold water about 16 hours, changing the water three times during the soaking period. Drain and cook in wire baskets 50 minutes at 15-lb. steam pressure. Longer cooking yields a darker brown bean but destroys the vitamin B_1.

Cut the pork into ½-oz. pieces and cook in a covered pan for 30 minutes at 15-lb. steam pressure. The original pork must be of excellent quality or it may become rancid during prolonged storage. In accelerated rancidity tests in which the frozen pork and beans were held at 40 deg. F., it was found that if the original pork were good, the pork stood up as long as the beans and sauce. The results of accelerated tests at 40 deg. F. probably are a good indication of the behavior at much lower temperatures for longer periods. The accelerated tests should not be interpreted as a recommendation for long storage at this higher temperature. Bacon gives markedly better flavor to the entire product than does fresh or salt pork.

For the sauce, tie the broken-up spices and ground onions in a cloth bag and cook for about an hour in order to extract the flavor. Then remove the bag of spices, add the sugar (saving about 15-lb. to mix with the cornstarch and pectin), salt and tomato puree. After the tomato is added, cook for as short a period as possible in order to retain the tomato color and flavor and the vitamin C. Mix together the pectin, cornstarch and the remaining sugar. Stir in the melted fat from the cooked pork, and enough cold water to make a thin paste. Add this mixture to the hot tomato-water-spice mixture and cook until the starch becomes clear (about 5 minutes). Make up to 100-gal.

Fill cellophane or other suitable bags in waxed cartons with 48 percent cooked beans and 52 percent sauce by weight, plus one piece of cooked pork per package, all cooled to 145 deg. F. or lower before packaging. Heat-seal the cellophane bags or seal paper bags and containers in a suitable manner.

Freeze and store at zero deg. F. or lower temperature.

For serving, partially thaw the pork and beans in the package in order to prevent overcooking and mashing of the outside layer before the center portion is thawed during cooking. Heat to serving temperature in a casserole in the oven or in a double boiler on top of the stove.

Discussion

When all of the ingredients were cooked together as is done in the canning procedure, the beans mashed badly and were difficult to package, the tomato was overcooked, and it was impossible to place uniform quantities of sauce and beans in each package. In the canning procedure, the starch from broken beans probably thickens the sauce but it was necessary in the procedure for freezing to add a thickening agent. The pectin is added to prevent curdling of the sauce when it is thawed. The curdling disappears, however, when the pork and beans are heated and stirred.

Formula from Western Regional Research Laboratory, Bureau of Agriculture and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, Albany, Calif.

FORMULA NO. 405

Fluffy Delight Icing

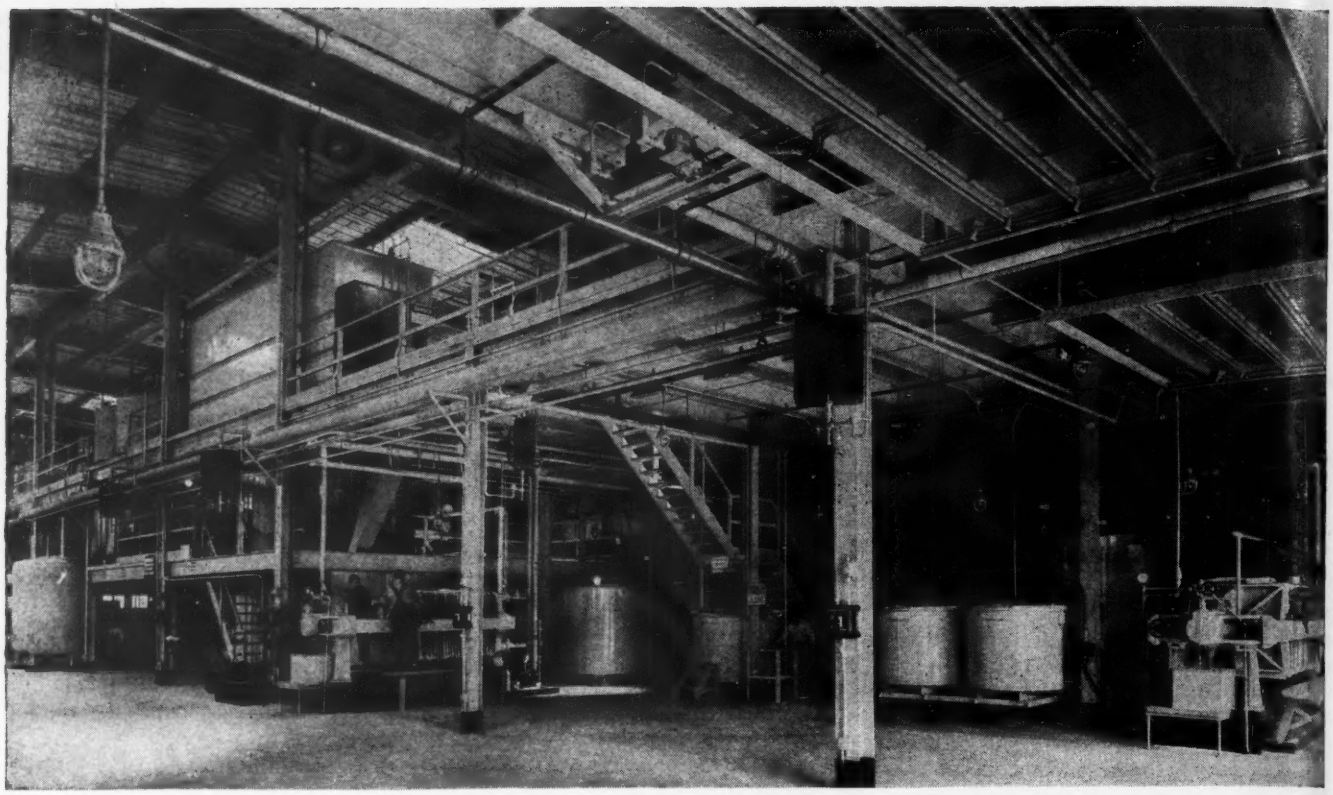
Water	1 lb. 12 oz.
Gelatine	2 oz.
Powdered sugar	12 lb. 4 oz.
Emulsifying-type shortening	5 lb.
Salt	2 oz.
Glucose	4 oz.

Directions

Dissolve the gelatine, glucose and salt in the water. Add slowly to the sugar and shortening in the bowl while mixing. Whip until light.

This icing combines the characteristics of cream icing and marshmallow icing. It has more covering power.

Formula from Procter and Gamble Co.



Vitamins for Victory

● In all wars since history began disease has been the cause of more casualties, both military and civilian, than the weapons of the enemy. During the last World War it began to be recognized that some of these diseases, such as scurvy, were caused by a definite deficiency of some essential ingredient in the diet while others probably spread because of lowered resistance of the population due to this and other dietary lacks. Because of their relationship to life, these essentials were termed vitamins. Since practically nothing was known about them at the time, little could be done toward correcting these deficiencies.

Since then science has made tremendous strides in the chemistry of vitamins. The structure of most of those isolated has been determined and methods for synthesizing many of them developed.

The nations of the world have not been slow to recognize the importance of the vitamins. In her rearmament program Germany included factories for their production along with those for manufacturing guns, explosives and other munitions of war. One important ingredient in the emergency ration of the German parachute troops has been tablets of synthetic Ascorbic Acid (vitamin C). Our own Government has also recognized the importance of this vitamin and has included a product containing synthetic Ascorbic Acid in the ration of our Armed Forces.

The United States and the British Empire have also included the maintenance of civilian health and morale in their war plans. Enriched flours and breads, to which a number of the vitamins together with certain minerals have been added, have received official sanction. This development has been hampered by an insufficient supply of one of the vitamin ingredients – Riboflavin (vitamin B_2).

Chas. Pfizer & Co., Inc. has been one of the largest producers of Ascorbic Acid (vitamin C) for several years. There has been a continual increase in our production of this synthetic vitamin and plans are now in the process of consummation which will still further enlarge our productive facilities.

After a research program of several years, the production of Riboflavin (vitamin B_2) was started by our Company in 1940. At the present time we are bending every effort toward a great increase in the size of our productive facilities in order to assist in supplying the large quantities of this essential vitamin which are needed.

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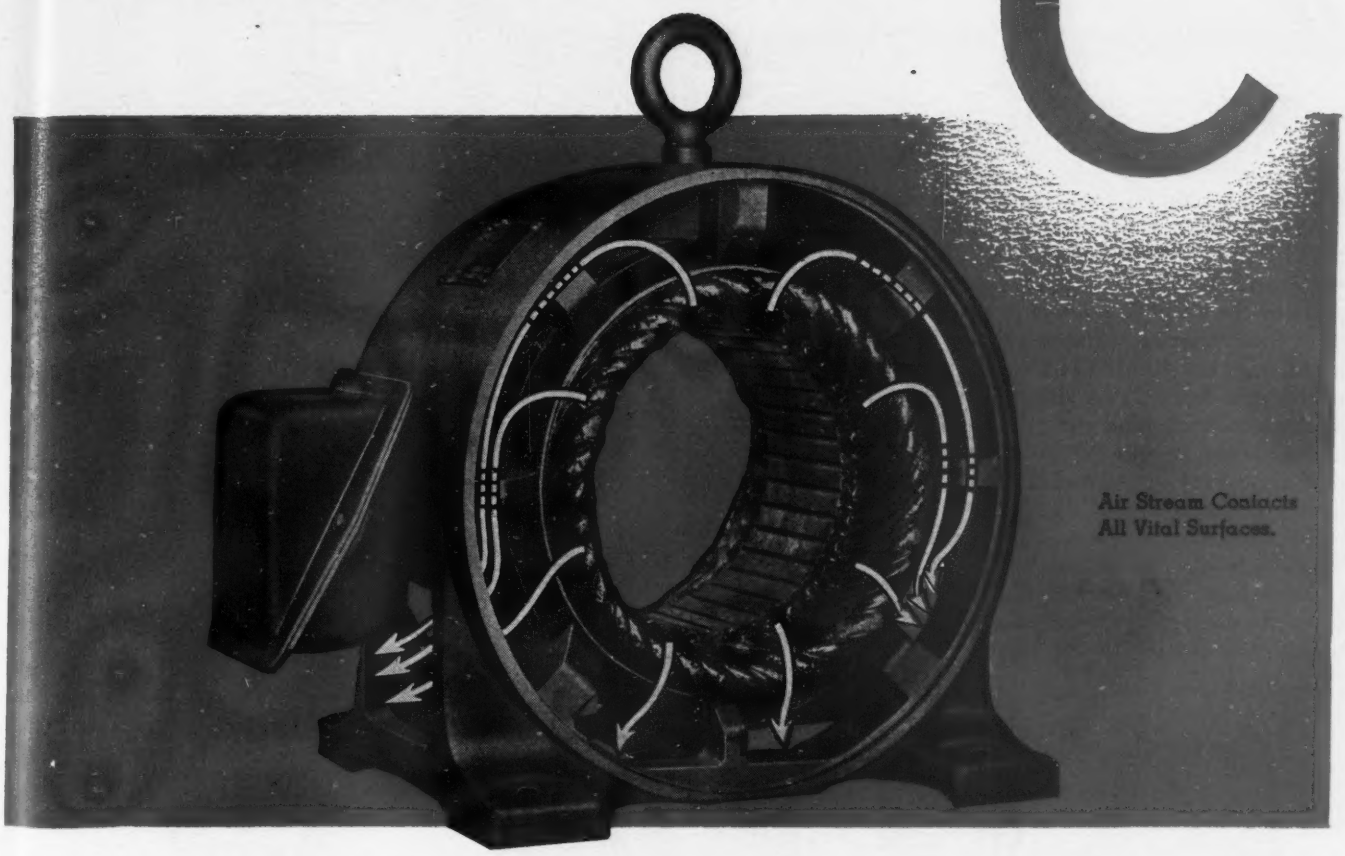
CENTURY FORM J
Ventilation System
Keeps the Motor Clean!



The Century method of motor ventilation not only protects the insulation by sending a blast of cooling air through spacious air passages to all vital motor parts, but also keeps the air passages clean. This is due to Century's ventilation design in which the *cooling air is:*

1. Drawn in around the bearing housing by two fans and the rotor bars.
2. Directed against the end of the rotor near the shaft.
3. Blown out across the copper conductor bar ends by the fans on the rotor.
4. Blown around the stator coil ends.
5. Deflected inside the frame across the outside of the stator laminations.
6. Forced out from the lower half of the frame at the side and bottom of the motor.

Century air passages are large and smooth —not easily clogged—and suspended matter is carried through the passages and blown out by the force of the cooling air blast.

Proper cooling and ventilating is only one of the many design and engineering advantages of Century Motors. For complete information as to the proper Century Motor to meet your requirements, call in your nearest Century Application and Service Engineer today.

Form J Motors Are Now Available in 2 to 15 hp

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Century MOTORS

1/6 to 600 horsepower.

One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World.

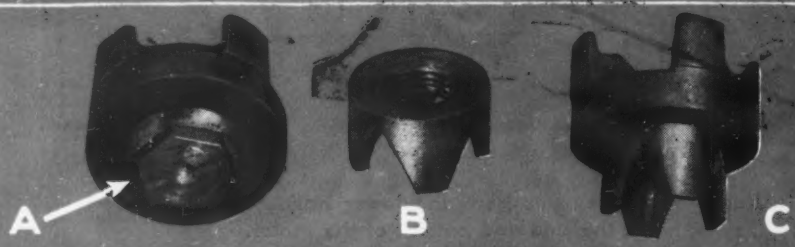
Prevent Valve Failure *before it starts!*

RAPID DESTRUCTION in Throttling Service can be prevented by use of Throttling Nut

This illustration shows the too common result of using a renewable composition disc valve for continuous throttling service. The bronze valve body was ruined by the effects of "wire drawing." The seat (1) was cut away; the outlet side of the diaphragm was penetrated (2).

Many of your renewable disc seat valves in throttling service may meet the same fate unless immediate action is taken to save them . . . a simple change that will convert them to withstand throttling.

This change can be quickly and easily made in any Jenkins Renewable Composition Disc Valve by adding a Jenkins Throttling Nut (Fig. 344). This provides an effective substitute for hard-to-get plug type valves, which would be first choice for services that require the extreme close regulation of flow. It reduces to a minimum the damaging effects of wire drawing, and greatly increases the life of the valve.



Throttling Nut Increases Valve Life 5 to 10 Times

Any Jenkins Renewable Composition Disc Valve can be converted for throttling service by removing standard disc nut (A) from standard disc holder, and replacing it with Jenkins Throttling Nut (Fig. 344) (B) to obtain assembly (C).

Since valve failure today can stall vital production, and since preventable wear is a needless waste of scarce valve metals, it is your duty to insist on effective conservation.

Make sure your valves are inspected regularly, systematically. Repair or replace worn parts before a valve destroys itself. Instruct maintenance workers thoroughly. Select valves for new installations carefully; install them properly. Consult Jenkins Engineers for assistance in improving your system of valve conservation.

Jenkins Bros., 80 White Street, New York, N. Y.; Bridgeport; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal; London.

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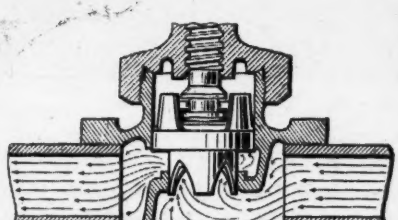
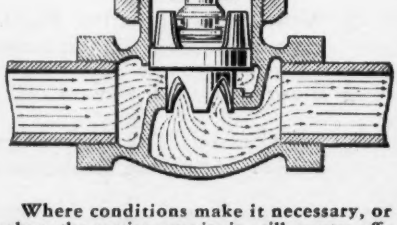


The legs of the Throttling Nut provide orifices which restrict the flow of liquids. Before any appreciable volume of fluid can pass through the throttling nut orifices, the seats are separated to such an extent that destruction from wire drawing of seat and disc is minimized. With this protection, seat and disc last much longer when valve is installed in the customary position . . . with inlet pressure beneath the seat, (above).



Where conditions make it necessary, or where the service permits it, still greater efficiency can be obtained if valve is reversed in the line, so that inlet pressure is applied on top of disc, (above). This permits expansion or discharge of fluid through the ports into central chamber of throttling nut, eliminating danger of impingement effects, the most common cause of seat and disc destruction.

NEW REYNOLDS METAL FOIL CONTAINER WINS

SPECIAL WAR PACKAGING AWARD!

For creating a new type of packaging material that is protecting food, drugs and ammunition *under every conceivable wartime condition,* Reynolds has received a Special Award in the 1942 All-America Package Competition.

The new material is a solid sheet of metal foil, laminated to cellophane and dense kraft. A protective layer of asphalt compound, plus a special heat sealing coating, combine with the foil to solve the "tin-can" problem. *Really armor-clad protection without the use of steel!*

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Manufacturers with war packaging problems are invited to write for full details on this new material and its application to specific needs.

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FOIL DIVISION

GENERAL OFFICES RICHMOND, VIRGINIA

REYNOLDS METAL

Head Start!

Because of the educational advertising of dextrose, the mother and father of this sprightly young man make certain his mind and body are generously powered with foods enriched with this food-energy sugar.

The educational advertising of dextrose helps insure the future health and stamina of young Americans. It continues even though supplies are temporarily insufficient to meet both government priorities and civilian demands.

CORN PRODUCTS SALES COMPANY
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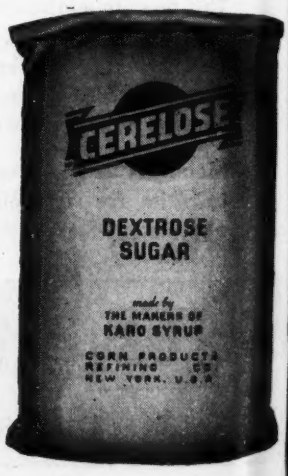
The advertising of dextrose, as an educational force, doubly benefits America. Consumers learn how this pure white, crystalline food-energy sugar forestalls fatigue, fortifies energy. Asking for foods "Enriched with Dextrose", they increase the use of American corn, grown by American farmers, refined in American factories, distributed by American companies.



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CRYSTALLINE VITAMIN A ALCOHOL
First Produced in Pure Form in the Laboratories of Distillation Products, Inc.

Our Organic Chemistry Department is making pure vitamin compounds and is exploring into new vitamin fields. Three crystalline vitamin A compounds are being sold for research purposes. Crystals of the vitamin A alcohol are shown at left. As a result of this research and industrial development, DPI now owns fifty-eight United States Patents and has many others pending. The Director of Research and his associates have published a number of papers on the art of molecular distillation and its applications. Reprints as available will be supplied to interested persons upon request.

. . . have produced what we believe to be the finest available concentrate of vitamin A

It is this type of research pioneering which has resulted in the unique concentrate known as *Distilled Vitamin A Esters.**

This unique concentrate of vitamin A is from two to ten times more resistant to the action of heat and air than any other representative commercial vitamin A material we have tested.

Distilled Vitamin A in the natural Ester form is *bland*. It does not impart flavor or odor to the most delicate foods. It is *continuously available*, and in scientifically *uniform quality*. Potency specifications are met precisely to your order.

Get the facts about this superior vitamin A concentrate. Write for "The Story of Vitamin A Esters," new, completely revised edition.

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Actual laboratory analyses have revealed that some potatoes have several times as much *calcium* as others. Some samples of spinach have ten times as much *iron* as others. Sometimes wheat is rich in *phosphorus*, other times very poor.

Abundant as nature may be in providing mankind with sustenance, she is unpredictable when it comes to supplying essential minerals. To say that any standard food substance is "rich in minerals" has little meaning, unless *that particular sample* has been analyzed for its mineral content. As a result, a diet including, for example, spinach to overcome a deficiency of iron may at times prove of little benefit.

Here is one time that man can "paint the lily" to good effect. Through mineral fortification, a *definite, unvarying* amount of calcium, phosphorus, and iron can be added to bread, cereals, soups, candy and similar staple foods . . . thus providing a dependable supply of these much-needed minerals that is neither lavish today nor niggardly tomorrow.

While the available supply of Victor mineral supplements is now used exclusively in war-essential foods, laboratory samples for experimental purposes can be supplied. Now is the time to prepare your product for the stiff post-war competition to come. Our technical staff will gladly lend assistance in solving processing or similar problems. Just write us.

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Monocalcium **PHOSPHATE**
Dicalcium **PHOSPHATE**
Tricalcium **PHOSPHATE**
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Disodium **PHOSPHATE**
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ARMY E NAVY

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WORLD'S LARGEST MANUFACTURERS OF FOOD PHOSPHATES
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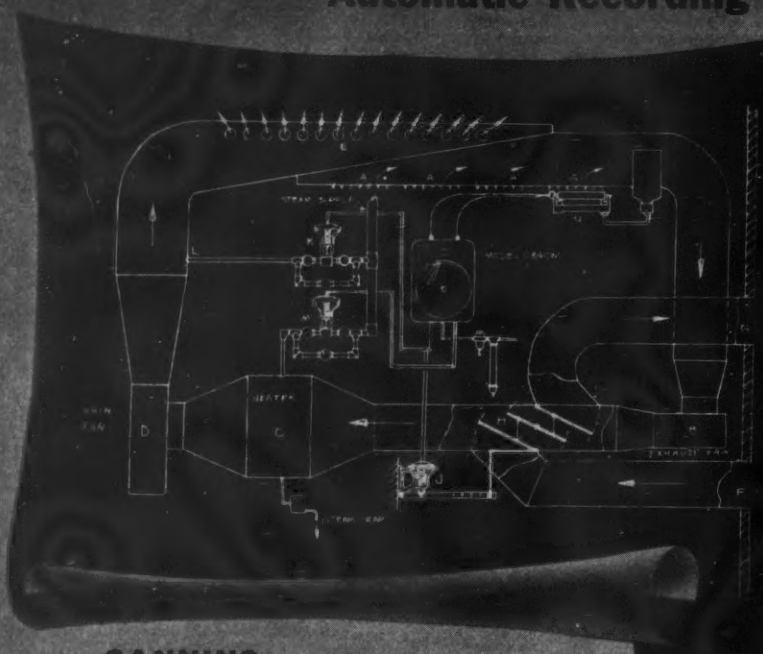
4 Ideas HELPING TO INSURE

Review of Food Processing in Wartime Reveals Importance of Automatic Recording and Control



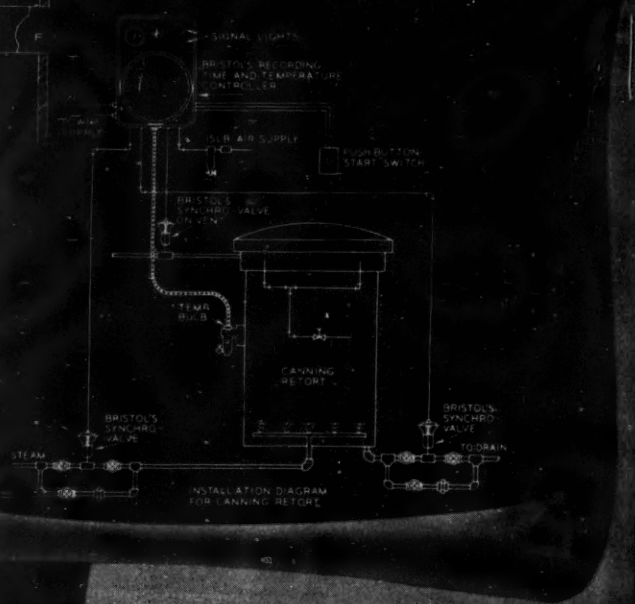
Typical Examples:

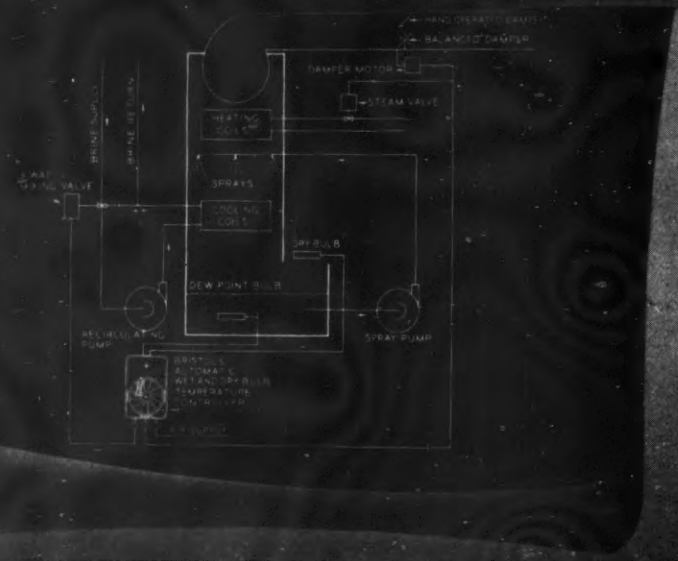
DEHYDRATION

Whatever your dehydration method, Bristol engineers offer you the benefits of wide, practical experience in applying specific instruments to the control of temperature, relative humidity and air flow in food processing. Alert to dehydration developments, they are ready to place the latest, proven facts and figures at your disposal.

CANNING

Bristol's System of Completely Automatic Retort Control operates all phases of the process from the time the containers are put into the retort and the cover is closed until the containers are removed. After the cover is clamped shut, it is only necessary to push a button in the front of the retort. Processing is completely automatic and uniform throughout the batch. Chances for error are eliminated.





MEAT TENDERIZING

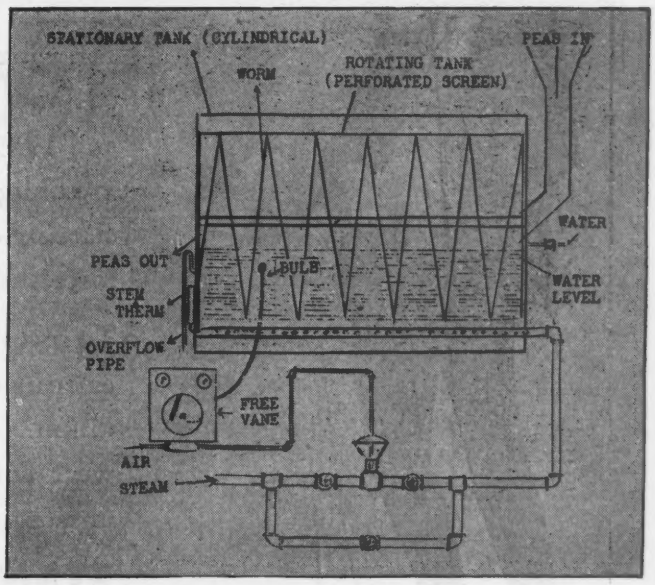
Bristol's automatic temperature and humidity controls on the TENDERAY PROCESS are helping to make possible a better, more palatable product . . . guarded against bacteria . . . with nutritive constituents preserved . . . with grading simpler and more uniform . . . and with the possibility of tremendously increased sales.

3 Square Meals

In their struggle to supply America's food needs against the handicaps of wartime scarcities in food materials and manpower, food processors are turning to experienced instrument-engineering for aid in stopping spoilage, protecting flavor and vitamins, saving fuel, increasing speed of certain operations. Charts on these pages are a partial indication of Bristol's contribution in solving these problems.

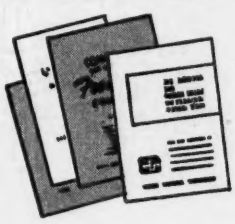
Pioneers in many fields of automatic control, Bristol engineers were first to work with food industries on dehydrated milk processes more than 10 years ago, and first to engineer successful controls for these processes.

In dehydrating, canning, meat-tenderizing, as well as the other food processes . . . wherever temperature, flow, liquid level, pressure, draft, time-of-operation, humidity, vacuum, and pH value must be controlled . . . Bristol's instrument-engineering has eliminated the uncertainties of manual control, and has replaced it with precision regulation.



BLANCHING

In blanching before dehydration, varying temperatures of 190° to 210° (depending on batch size and hardness) had to be held from 2 to 10 minutes. Bristol Free-Vane Controller, operating diaphragm valve in steam line, made constant watching unnecessary, reduced spoilage and fuel costs.



Free Bulletin Service Helps Solve Food-Instrument Problems

- **Bulletin A-112.** Complete facts on the Bristol Free-Vane System of Control, now used in many food plants.
- **Bulletin 550.** Instruments for dairy industry.
- **Bulletin 38.** Automatic control in canning industries.
- **Bulletin 512.** Coordinated controls for plant processes as installed in food, textile, metal, plastics, rubber and other industries.

THE BRISTOL COMPANY

115 BRISTOL ROAD, WATERBURY, CONNECTICUT

The Bristol Co. of Canada, Ltd.
Toronto, Ontario

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Engineers Process Control for Better Products and Profits

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

Tighten up Your Belt, MR. CITIZEN!

Mr. Citizen ate almost as well in 1942 as he did in 1941 . . . and considerably better than he did between 1935 and 1939. But he won't do so well from now on, for we are obligated to provide foods for our fighting allies and starving civilians abroad as well as for the largest military force this country has ever assembled.

To provide these foods processors must maintain all existing facilities and equipment in sound working condition . . . must restore immediately such facilities when wear and tear, damage or failure have rendered them unsafe or inefficient.

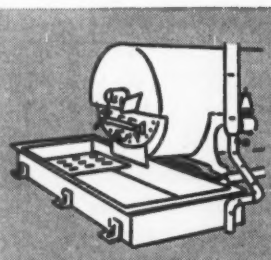
We may be able to help you in your war effort. Consultation is invited.

When the War is Won!

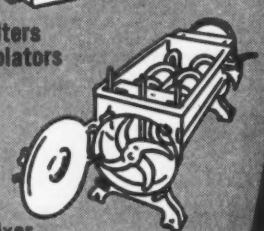
Now is the time to plan against tomorrow's problems. Our 28 years' experience in designing and building food processing equipment is available, without obligation, to help you formulate such plans.

Put Your Mixing Problems up to

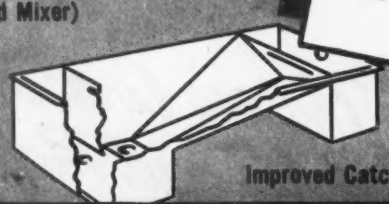
HOTTMANN



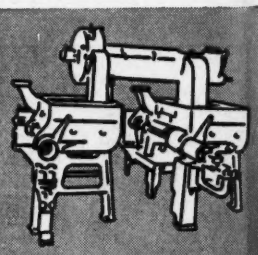
Fat Melters and Percolators



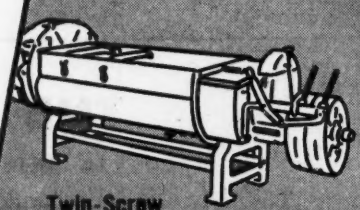
Kutmixer (Combined Cutter and Mixer)



Improved Catch Basin



Yeast Machinery



Twin-Screw Super Mixer

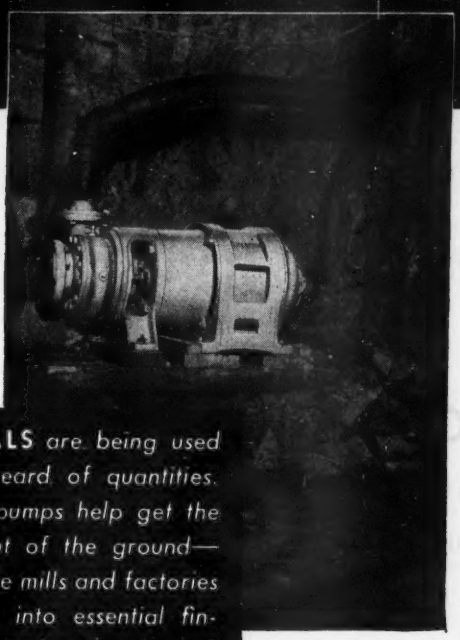
Mixer, Interior view

THE HOTTMANN MACHINE COMPANY

3325-47 East Allen Street • Philadelphia, Penna.

For 24-Hour-A-Day Pumping Service *Select the*

MOTORPUMP

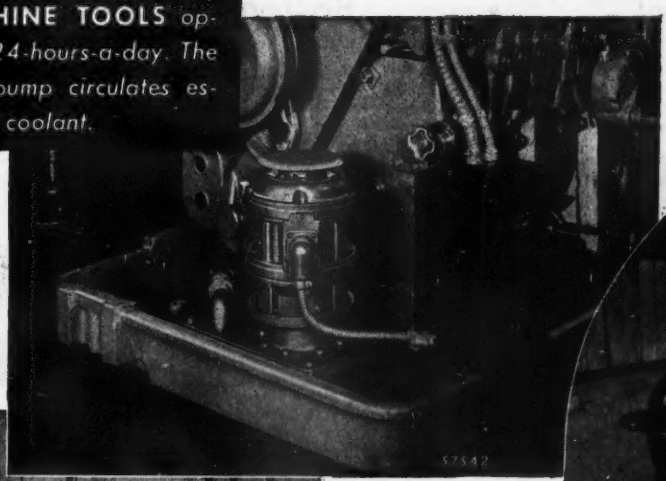


METALS *are being used in unheard of quantities. Motorpumps help get the ore out of the ground—help the mills and factories turn it into essential finished products.*

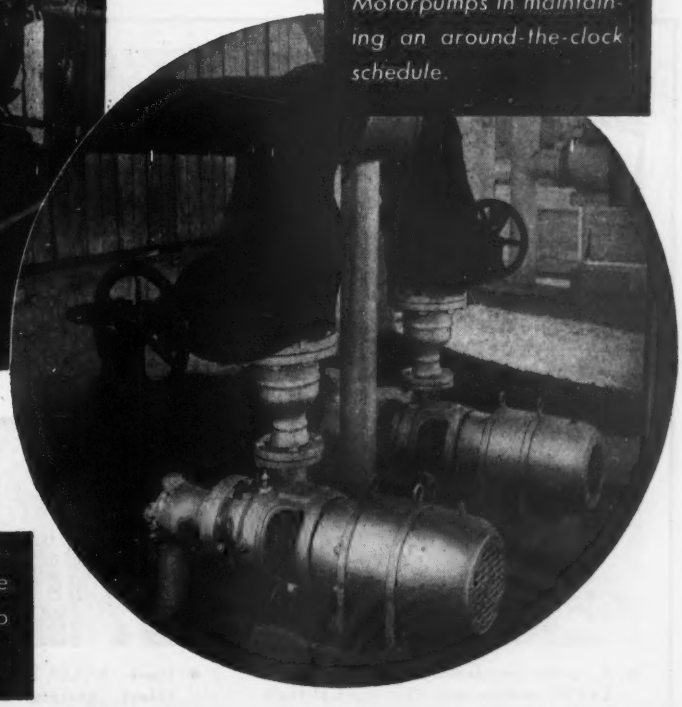
The Motorpump shaft is extra-heavy—its bearings are oversize—pump and driver are a single unit on the same shaft—the stuffing-box is deep and carefully designed. Furthermore, the Motorpump is highly efficient and unusually compact.

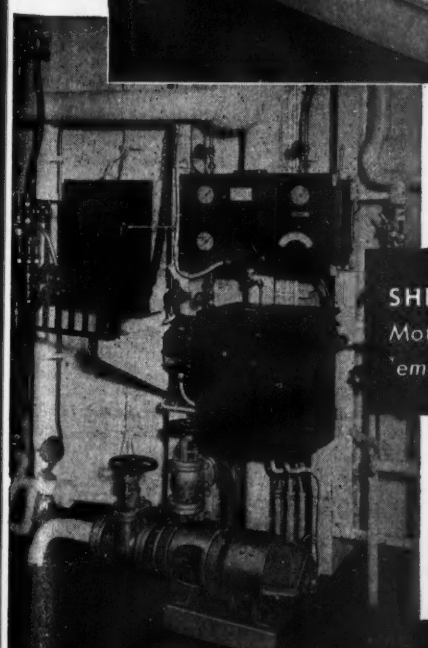
It is available in sizes to handle from 5 to 1800 gals per min at pressures up to 215 lb per sq in. Thousands of them are being used in essential production processes to bring water, gasoline, oil and a multitude of other liquids to the right place at the right time.

MACHINE TOOLS *operate 24-hours-a-day. The Motorpump circulates essential coolant.*



REFINERIES *depend on Motorpumps in maintaining an around-the-clock schedule.*





SHIPS *are vital. The Motorpump helps to keep 'em sailing*

Ingersoll-Rand

CAMERON PUMP DIVISION

11 Broadway • New York, N.Y.

9-201

Fifty Years of Continuous Engineering Service

CHAS. T. MAIN, INC.

ARCHITECTS – ENGINEERS

1893 ARCHITECTS CHAS·T·MAIN INC ENGINEERS 1943

FOOD DEHYDRATION PLANTS

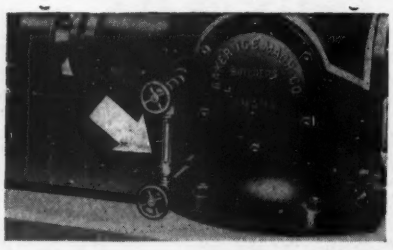
INDUSTRIAL ARCHITECTURE • STRUCTURAL ENGINEERING

STEAM, ELECTRICAL AND HYDRAULIC ENGINEERING

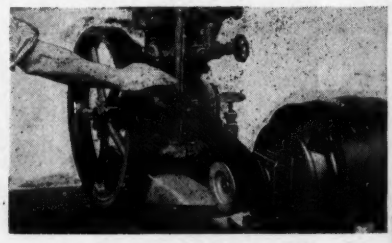
AIR CONDITIONING • REFRIGERATION

DESIGN AND CONSTRUCTION MANAGEMENT

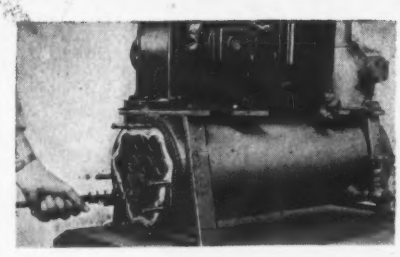
201 Devonshire Street • Boston, Mass.



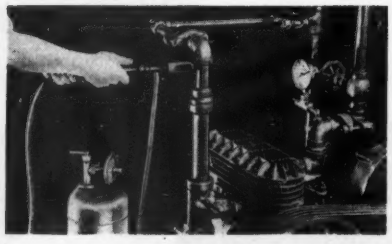
● Make sure your equipment is getting proper lubrication. Use only recommended grade of refrigeration oil in the compressor.



● Check V-belts for proper tension. Keep sheaves clean and properly aligned. Keep oil and grease away from V-belts.



● A clean condenser saves power. BAKER service men have special tools for freeing tubes of sludge and scale.



● Have BAKER'S service man give valves, gaskets, condensers, etc., a professional leak-inspection. Prevents costly waste.

● Today, an expert valve-checkup is a *must*. Gas-tight compressor valves are necessary to attain full cooling capacity.

BAKER

COMMERCIAL AND INDUSTRIAL REFRIGERATION EQUIPMENT

BAKER ICE MACHINE CO., INC. • OMAHA, NEBRASKA

Have inspections made by your BAKER service man regularly; have any needed replacement parts installed promptly. EXPERT MAINTENANCE PAYS RICH DIVIDENDS. Call your BAKER distributor now.

On Guard Against BACTERIA

ROCCAL

TRADE MARK REG. U.S. PAT. OFF

MODERN SANITIZING AGENT FOR THE FOOD INDUSTRY

SANITIZE all surfaces coming into contact with food in the packing process by washing with a solution of 1-ounce ROCCAL to 5-gallons of water.

USE ROCCAL FOR—

Poultry Packing Equipment • Cookers
Egg Breaking Equipment • Truck Racks
Food Chutes • Commercial Refrigeration

- **Non-Corrosive . . . *saves metal & rubber***
- **Active at Low Temperatures . . . *saves fuel***
- **Highly Germicidal . . . *keeps bacteria counts low***
- **Non-Irritating . . . *kind to hands***
- **Highly Stable . . . *does not deteriorate in storage.***

ECONOMICAL TO USE

As a Sanitizer..... 1-oz. to 5-gallons of water
As a Spray.....1-oz. to 1-gallon of water
For Mopping.....1-oz. to 2-gallons of water

ROCCAL is also an Effective Germicide for *Floors, Locker* and *Shower Rooms.*

LITERATURE & SAMPLE AVAILABLE

WINTHROP CHEMICAL COMPANY INC. SUCCESSOR TO
ALBA PHARMACEUTICAL DIVISION
170 VARICK STREET, NEW YORK, N. Y.

Make flavor go further with D&O

SPICEOLATES

"SOLUBILIZED" SPICE OIL FLAVORS

Solve one of today's big supply problems resulting from governmental restrictions on the use of spice oils with . . . SPICEOLATES.

These fine spice flavors can be used with considerable advantage—not only in replacing completely the dry spices you may now be using—but also to extend your present spice supplies.

WRITE US WITHOUT DELAY!

★

D.O ESTABLISHED 1798

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180 VARICK STREET · NEW YORK, N.Y.

BOSTON · CHICAGO · PHILADELPHIA · ST. LOUIS · LOS ANGELES

Plant and Laboratories Bayonne, N.J.

SPEED UP PRODUCTION FLOW

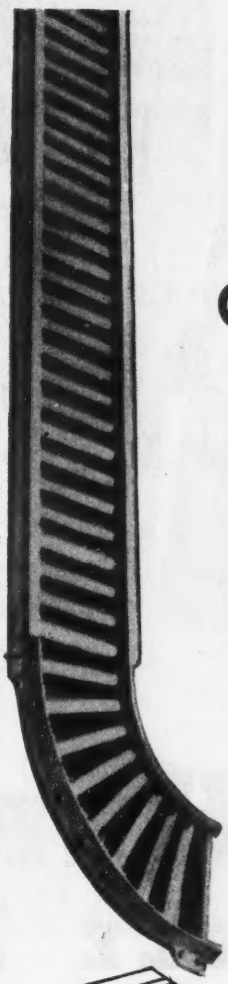
with

DAMROW

engineered

POWER or GRAVITY

CONVEYORS



In the fast-flowing production lines of many Industries today you'll find the results of DAMROW engineering skill in moving materials faster . . . . Compact, efficient, smooth-working conveyor systems that save man-hours, make floor space pay higher dividends, streamline many processing operations for the quick delivery of "MORE—SOONER" that is our big job now.

WHAT'S *YOUR* PROBLEM?

Is it moving products between operations—loading or unloading—floor to floor transfer—putting more production-flow in in limited space—assembly-line or packing-line "feeding"—continuous assembly conveying, DAMROW Engineers may offer a profitable solution to these and many other problems in YOUR plant. Write today!

DAMROW BROTHERS CO.
190 WESTERN AVENUE
Fond du Lac Wisconsin

Custom-Designers of HANDLING STORAGE and PROCESSING EQUIPMENT for the FOOD INDUSTRY

Continuous! Automatic! No Labor!

(a) Primary state Hersey Dehydrator removing half the moisture.

(b) Four secondary stage Hersey Dehydrator.

(c) Dried potatoes being discharged from a secondary stage Dehydrator.

HERSEY
VEGETABLE DEHYDRATOR

Above photographs show the Hersey in operation in Westfield, Maine

• **CONTINUOUS IN OPERATION** taking the product in continuous flow from the last washer and discharging without further attention to the packaging room

COMPLETELY AUTOMATIC in movement of product, temperature control and cycle time **NO OPERATORS NEEDED**

UNIFORM TREATMENT because the product is in motion and is being turned over constantly Every particle receives exactly the same treatment

Constructed of

NON-STRATEGIC MATERIALS such as wood, cast iron, etc., wherever possible

• ***Send for Catalog Today***

HERSEY MANUFACTURING CO.

DRYING ENGINEERS FOR MORE THAN 60 YEARS

381 E STREET • SOUTH BOSTON, MASS.

WON'T CONVERSION TO GLASS CONTAINERS NECESSITATE ALL NEW EQUIPMENT, MR. KNISELL?
ONLY A SEALING MACHINE, WHICH WE CAN PROVIDE AT NOMINAL RENTAL

It's simple. Yes—and it's inexpensive, too. Switching from critical cans to non-critical glass, we mean. Often, the only equipment additionally needed is a sealing machine. We'll provide that for you—at nominal annual rental. Or, in some cases, slight changes in your present equipment may be required. Our Packaging Engineers will be happy to help you. They'll get you straightened away in no time.

So remember Anchor Hocking. No matter what you pack—solid, semi-solid, powder or liquid; or how you pack it—hot or cold, with or without vacuum, sterilized or processed—we can supply you with standard containers and closures you'll call "custom-built for my every requirement!"

EDWARD L. KNISELL, one of Anchor Hocking's ablest and most popular men, has been a member of the Anchor Hocking family for 25 years.

ANCHOR HOCKING

GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION · LANCASTER, OHIO

High Speed Scales for Dehydrated Food Products

Weighing and packaging 5-lb cans of dehydrated potatoes in the plant of E. A. Coutre Dehydrator, Modesto, California.

Fruit and Vegetable Packaging . . .

Man power shortage, short ocean shipping space, and lack of tin for canning have forced new processing methods . . . revolutionary new packaging of fruits and vegetables in particular. No food products thus far created by man and necessity lend themselves more completely to modern EXACT WEIGHT packaging than present day dehydrated food products. What is required is handling smaller containers, light in weight, with speed and accuracy. EXACT WEIGHT high speed scales are ideally fitted for this task of volume production in short efficient day or night shifts with profitable results. Write for full details for your operation today.

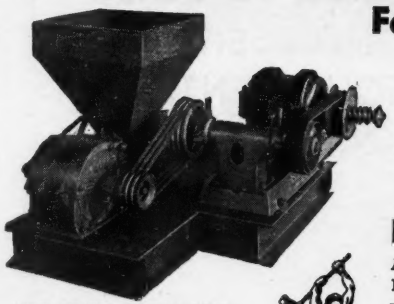
THE EXACT WEIGHT SCALE COMPANY

21 W. Fifth Ave., Columbus, Ohio

Exact Weight Scales

GRUENDLER CRAFTSMANSHIP

Employed by U. S. A. in the WAR EFFORT



Food Processing Equipment

Meeting Different Products and Capacity Requirements

"DUSTLESS OPERATION"

Requiring no auxiliary separators, fans or collection attachments. "Built in Many Sizes"

"Illustrated Bulletin on Request"

MASTER PULVERIZER

Adjustable from 30 mesh to 100 mesh and finer—a most popular type of pulverizer for food products, cocoa, sugar, grains, spices, whole wheat flour grains, etc.—Write our Engineers.

GRUENDLER ST. LOUIS, U.S.A.

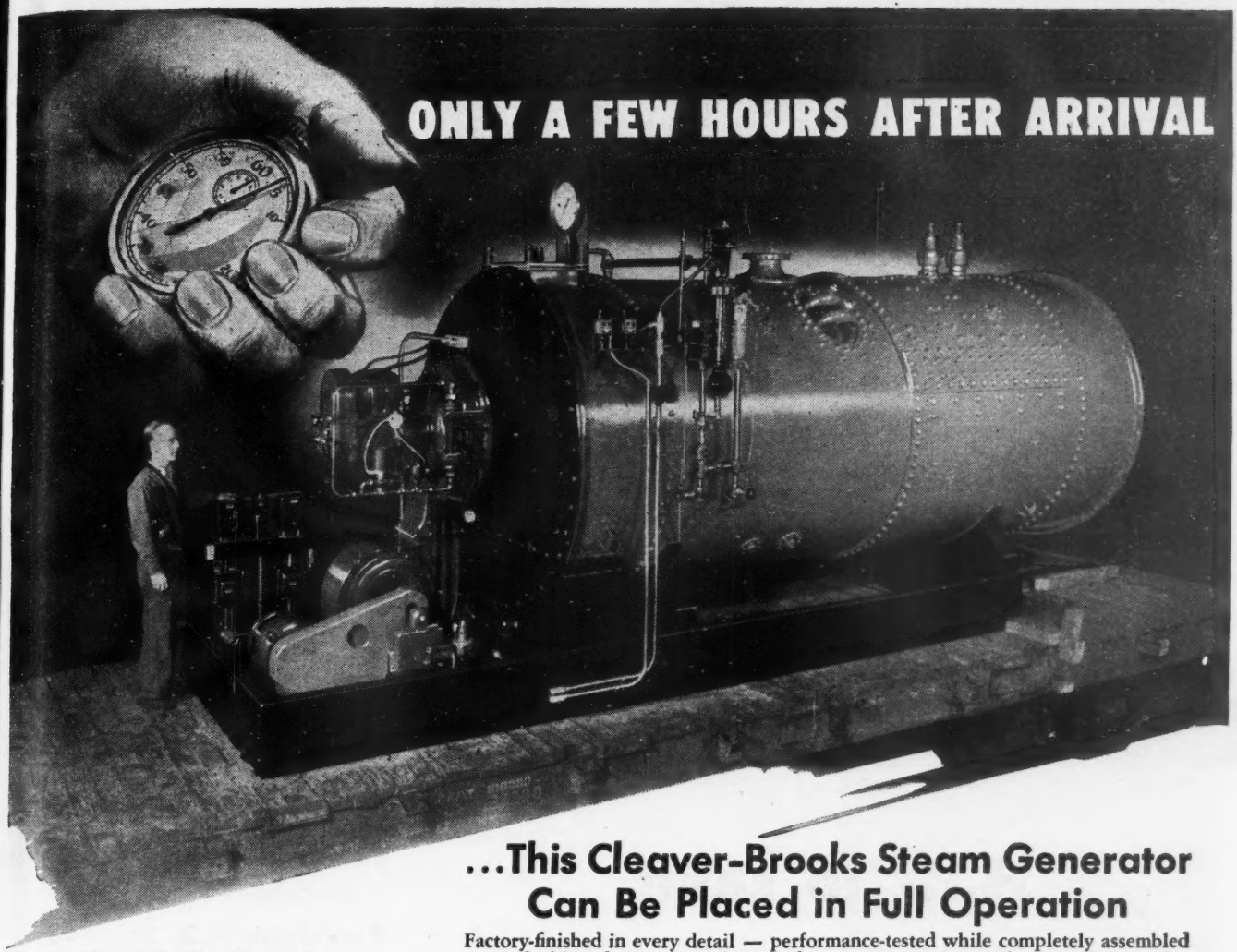
GRUENDLER

OUR FIFTY-EIGHTH YEAR

GRUENDLER CRUSHER & PULVERIZER CO.

PLANT and MAIN OFFICE — 2915-17 N. MARKET • ST. LOUIS, MO.

This is the Famous
LEE
PROCESSING KETTLE
Serving America's Navy, Army, Victory Fleet —everywhere . . . and serving them well!
Corrosion and metallic contamination resistant . . . stainless and easy to clean, LEE Stainless Processing Kettles, Tanks and Equipment are built for . . . and give . . . faster, more efficient processing! Do you have the LEE catalog?
LEE METAL PRODUCTS CO., Inc.
416 Pine Street • Philipsburg, Penna.
LEE



A Cleaver-Brooks Steam Generator Just Out of Factory Test-Pit—Ready for Shipment When Blocked and Trim Removed.

...This Cleaver-Brooks Steam Generator Can Be Placed in Full Operation

Factory-finished in every detail — performance-tested while completely assembled — and shipped as a complete ready-to-operate unit — the installation of a Cleaver-Brooks steam generator is only a matter of hours, rather than weeks of time. A job that is usually costly in time and money is reduced to a few simple piping and electrical connections.

These modern oil-fired steam generators are the answer to the demand of American industry and the military services for a steam plant with these advantages:

- —greatest fuel economy — 80% efficiency guaranteed.
- —quick steaming—for any emergency or fluctuating loads.
- —clean — no smoke, ashes, soot or clinkers.
- —compact "packaged" construction saves space.
- —positive blower air supply eliminates high, costly stack; only a simple, short vent is required.
- —four-pass down-draft construction gets all possible heat from fuel.
- —one source and one responsibility for the complete unit — Cleaver-Brooks.

Whatever your present or future need for steam — within the range of a single installation (20 to 500 HP. — pressures 15 to 200 lbs.) or that of a battery of Cleaver-Brooks Steam Generators, secure full information now in anticipation of the time when normal conditions return.

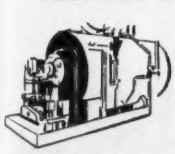
CLEAVER-BROOKS COMPANY, 5103 N. 33rd St., Milwaukee, U.S.A.

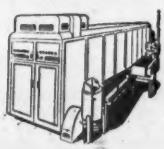
WHY INSTALLATION TIME IS CUT!

- ✓ *No Stack*
- ✓ *No Brickwork*
- ✓ *No Special Foundations*
- ✓ *No Breeching*
- ✓ *No Multiple Sources of Supply*

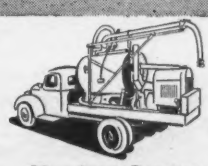
Cleaver-Brooks
STEAM GENERATORS

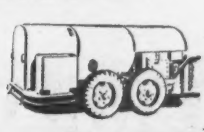
CLEAVER-BROOKS PRODUCTS INCLUDE:


Steam Generators


Food Dehydrators

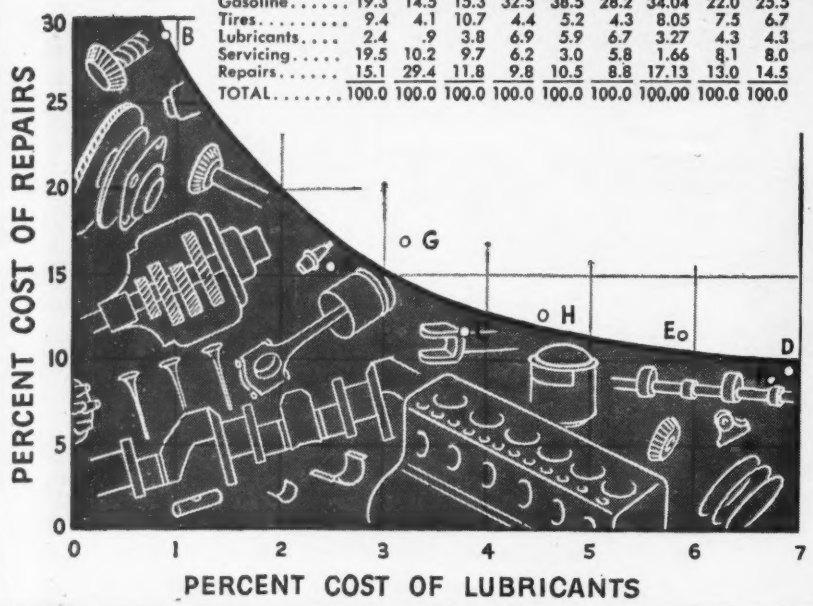
Tank Car Heaters


Bituminous Boosters


Special Military Equipment

TYPICAL DISTRIBUTION OF FLEET OPERATING COSTS
Per Cent of Total by Fleets or Groups

	A	B	C	D	E	F	G	H	Av.
Overhead.....	7.7	23.1	14.2	10.8	8.8	11.2	4.87	11.2	11.5
License & Insur.	5.6	5.6	14.8	9.3	8.7	11.0	13.03	5.6	9.2
Depreciation...	21.0	12.2	19.7	20.1	19.4	24.0	17.95	28.3	20.3
Gasoline.....	19.3	14.5	15.3	32.5	38.5	28.2	34.04	22.0	25.5
Tires.....	9.4	4.1	10.7	4.4	5.2	4.3	8.05	7.5	6.7
Lubricants....	2.4	.9	3.8	6.9	5.9	6.7	3.27	4.3	4.3
Servicing.....	19.5	10.2	9.7	6.2	3.0	5.8	1.66	8.1	8.0
Repairs.....	15.1	29.4	11.8	9.8	10.5	8.8	17.13	13.0	14.5
TOTAL.....	100.0	100.0	100.0	100.0	100.0	100.0	100.00	100.0	100.0



KEY

A—Oil Co. Survey of Several Fleets, Av.
B—Large Public Utility Fleet
C—Scattered Fleet of 400 Vehicles
D—Scattered Fleet of 300 Coupes
E—Scattered Fleet of 450 Cars
F—Fleet of 300 Half-Ton Pickups
G—Autocar Company's Report (Adjusted)
H—"Composite" Iowa Automobile Costs

How to save scarce parts and labor

• GRAPHIC EVIDENCE that scarce parts and labor can be saved by good lubricants is given in the chart above. It represents the experience of many fleets, as shown by the table. Note that in practically all instances, fleets that spent more for lubricants had lower repair expense—also a much lower total of lubricants plus repair costs than the other fleets.

That was important, even in normal times. But today, with repair parts and labor both hard to get, the cost of lubricants is even less important. The only question is, "How much will it save on maintenance?"

Doesn't that suggest the first step to take in your preventive maintenance plan? Find out exactly what your costs are for repairs and for lubricants. Then work toward adopting lubricants that will lower the total of *both*.

Here's how a Standard Oil Man can help you. He can recommend lubricants that will help reduce wheel bearing maintenance and chassis repairs, or motor oils that will eliminate troublesome varnish and engine deposits. From his experience with these products on other fleets, he can help you save both scarce parts and labor. Call any local Standard Oil (Indiana) office, or write 910 S. Michigan Ave., Chicago, Ill. In Nebraska, call any Standard Oil Company of Nebraska office.

Start saving with one of these detergent-type oxidation-inhibited motor oils.

Stanolube H.D. This heavy-duty oil for gasoline and Diesel engines is available only to the U. S. Government and fleet operators. It represents our most advanced development in an oxidation-inhibited, detergent-type oil for protection against varnish, engine deposits, and the resultant overhaul and maintenance expense.

Standard Bus and Truck Oil. Designed for moderately heavy-duty service in gasoline or Diesel-powered trucks and buses where its detergency and oxidation-inhibited quality assures cleaner engine operation than can be obtained with conventional type motor oils.

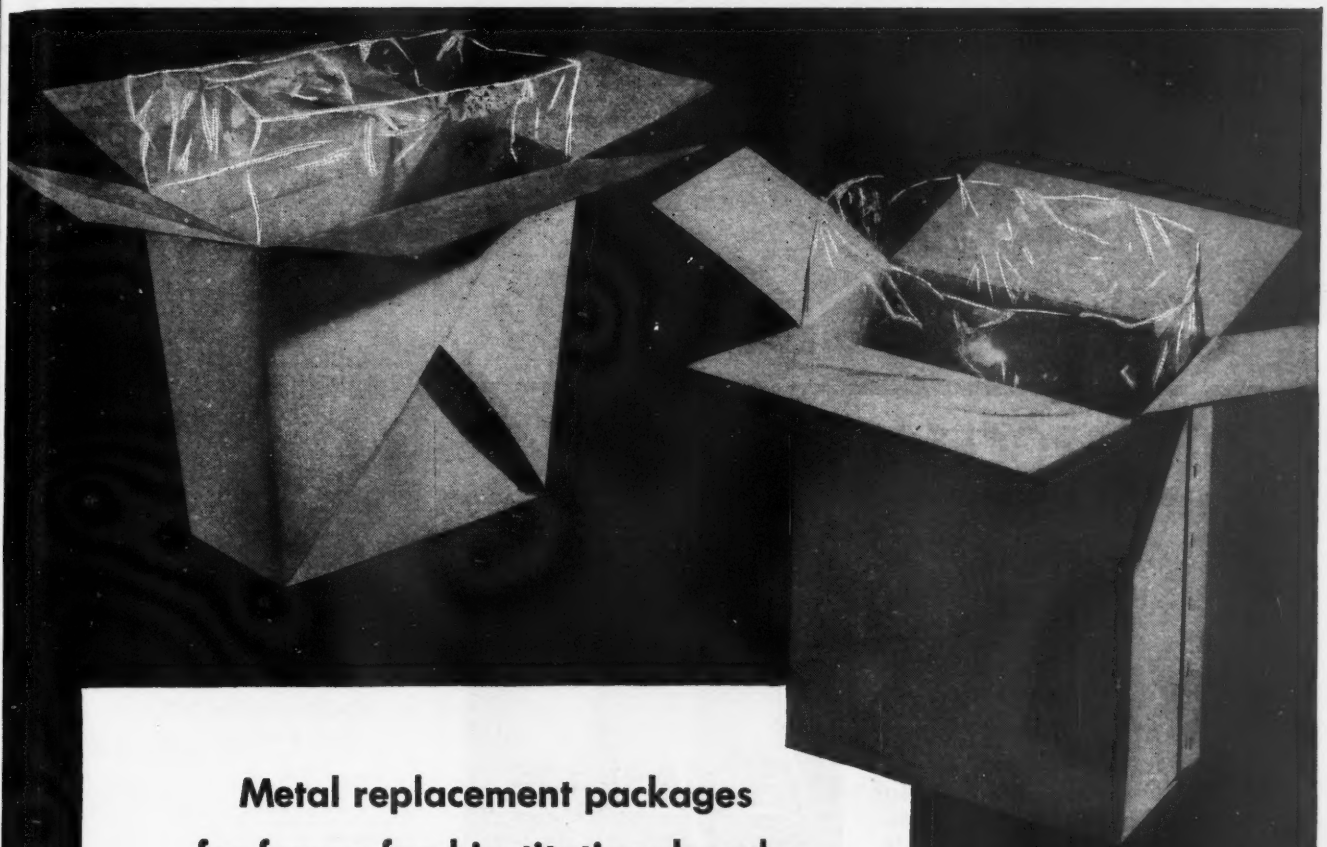
A Standard Oil representative can advise you which of these war-duty oils is best fitted for your equipment.

Oil is ammunition . . . Use it wisely

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ **FLEET CONSERVATION SERVICE**

FOOD



Metal replacement packages for frozen food institutional packs

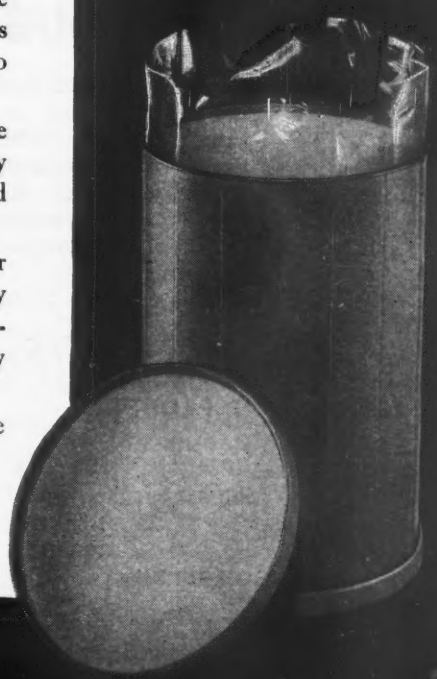
THE DU PONT
CELLOPHANE BAG-IN-BOX

The new Cellophane bag-in-box container—available in the various types and sizes illustrated—offers excellent possibilities as a replacement for the metal containers formerly used to package institutional packs of frozen foods for civilian use.

These new units follow logically in the footsteps of the Cellophane consumer size unit—which, over a period of many years, has proved its protective value against dehydration and spoilage of frosted fruits and vegetables.

A sturdy, leakproof Cellophane bag is ideal protection for the product, and a fibreboard carton provides the necessary structural strength. These units are easy to handle in all production operations—loading, unloading, and freezing. They are efficient and economical.

E. I. du Pont de Nemours & Company (Inc.), Cellophane Division, Wilmington, Delaware.



DU PONT
REG. U.S. PAT. OFF.

Cellophane FOR VICTORY PACKAGES

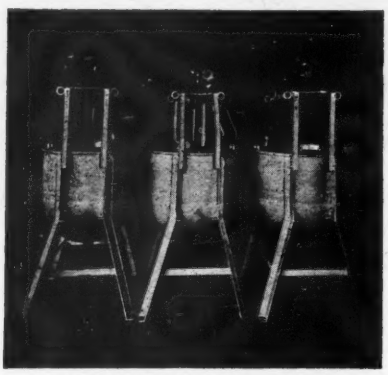
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Edge Moor "Stainless"

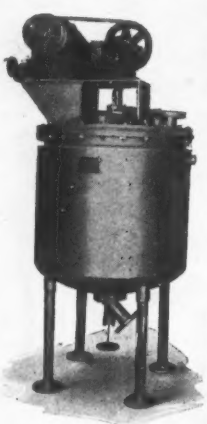
FOOD PROCESSING EQUIPMENT

"To your Specifications"

Edge Moor "Stainless" steel mixing and processing equipment can be produced to meet the strictest specifications in rapid time under a guarantee of satisfactory workmanship and performance. Edge Moor shops possess every tool needed to do the most exacting work.



● STAINLESS STEEL COOKING KETTLES WITH SCRAPING AGITATION FOR FOOD DEHYDRATION PLANT



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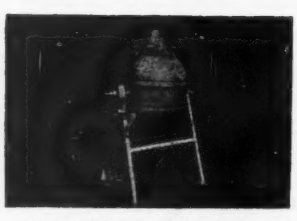
..TO OUR STANDARDS..

Our standard designs may meet your needs, thus saving valuable time and placing responsibility on Edge Moor process engineers to meet guarantees of performance.



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Write for Bulletin 115

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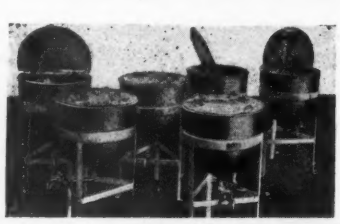

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"and the food's swell, mom!"

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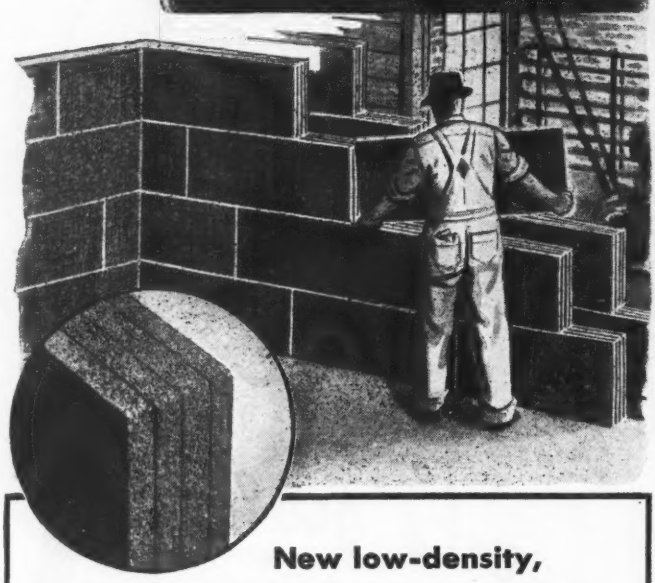

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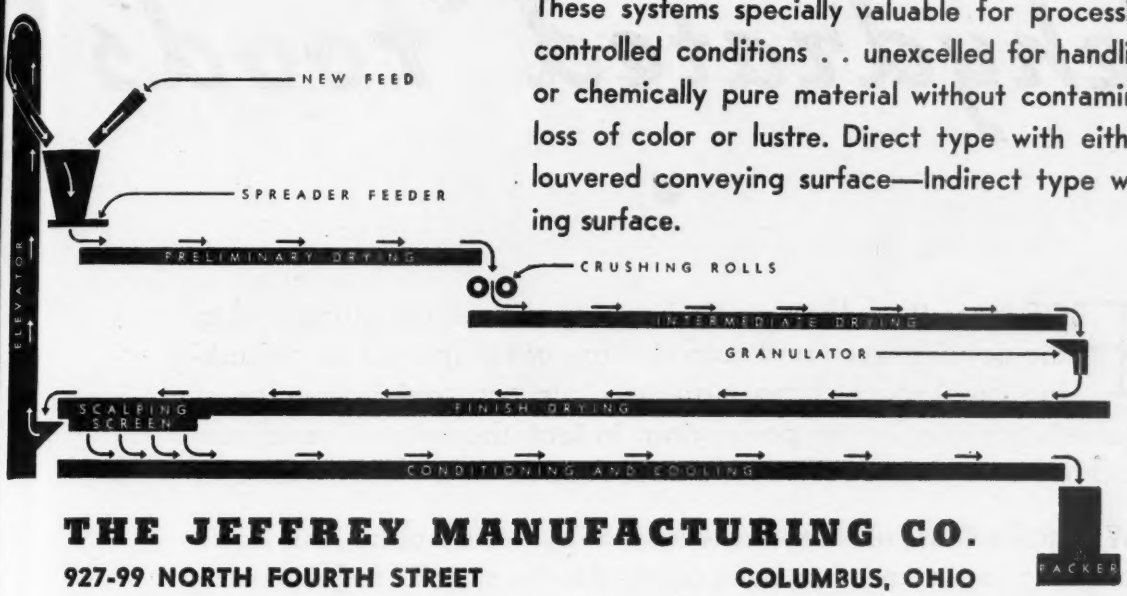

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CUSTOM-BUILT Systems — The typical flowsheet (left) illustrates how the inherent design allows perfectly standard units to be arranged in exactly the right combination for any particular job. Standard Jeffrey auxiliary units include: air systems, crushers, granulators, screens, feeders, pulverizers, packers, etc.

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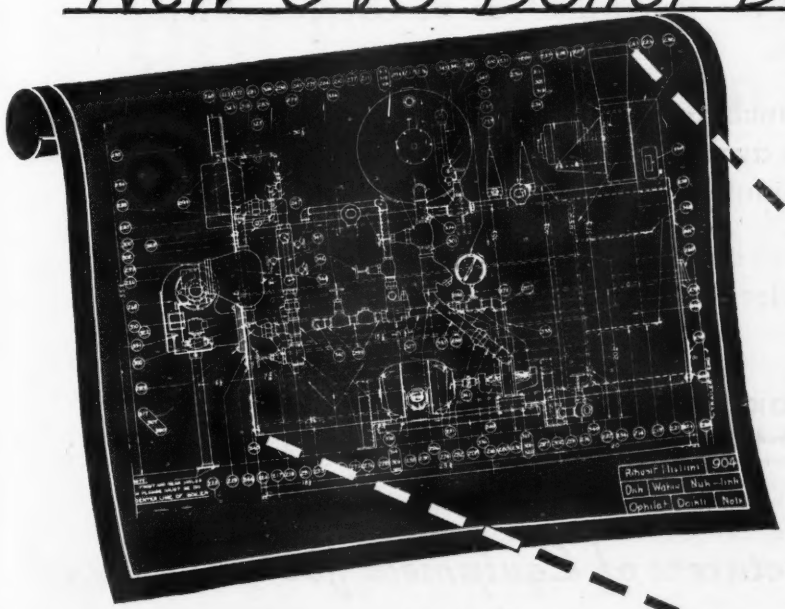
New O+S Boiler Designed for

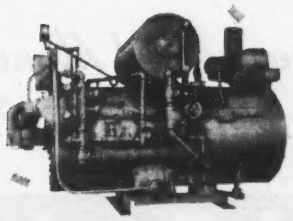


***EFFICIENCY!**—utilizes maximum BTUs for highest steam production . . .*

***SPEED!**—develops 100 lbs. pressure from 60° water in 20 minutes . . .*

***COMPACTNESS!**—sturdily built yet exceptionally light in weight . . .*

They measure Time by seconds in the U. S. Army. So Orr & Sembower's engineers designed this new fully-automatic boiler—for use in the Army's mobile laundry units—with speed as well as efficiency in mind. Simply, compactly designed—this new boiler makes fast, easy cleaning possible—offers industry many other exclusive advantages.



Although developed expressly for mobile use in the Army's laundry units, this revolutionary O & S boiler promises wide application in your industry when Victory makes O & S boilers again available for all purposes.

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DEBULKING and COMPRESSING of

Dehydrated Foods

FOR more than 45 years Stokes engineers have pioneered in the development and manufacture of equipment for debulking and compressing materials into compact briquettes or tablets preparatory to packaging. In fact, the original machine-made pharmaceutical tablet was produced on a Stokes machine.

With the advent of large-scale food dehydration plans, this accumulated experience has been applied to the specific requirements of the Food Industry.

Today, certain of the Army "K" rations, compressed soups, coffee, cocoa cubes, bouillon cubes, concentrated foods, egg powders, milk powders and other food specialties are among the many dehydrated foods that are being and can be compressed on Stokes Tablet Machines.

More than 30 single punch and rotary models of automatic compressing machines are available. Production rates up to several hundred tablets per minute. Special machines built to order.

Use the experience of our engineers and our well-equipped, semi-plant scale laboratory for the solution of your debulking or compressing problems.

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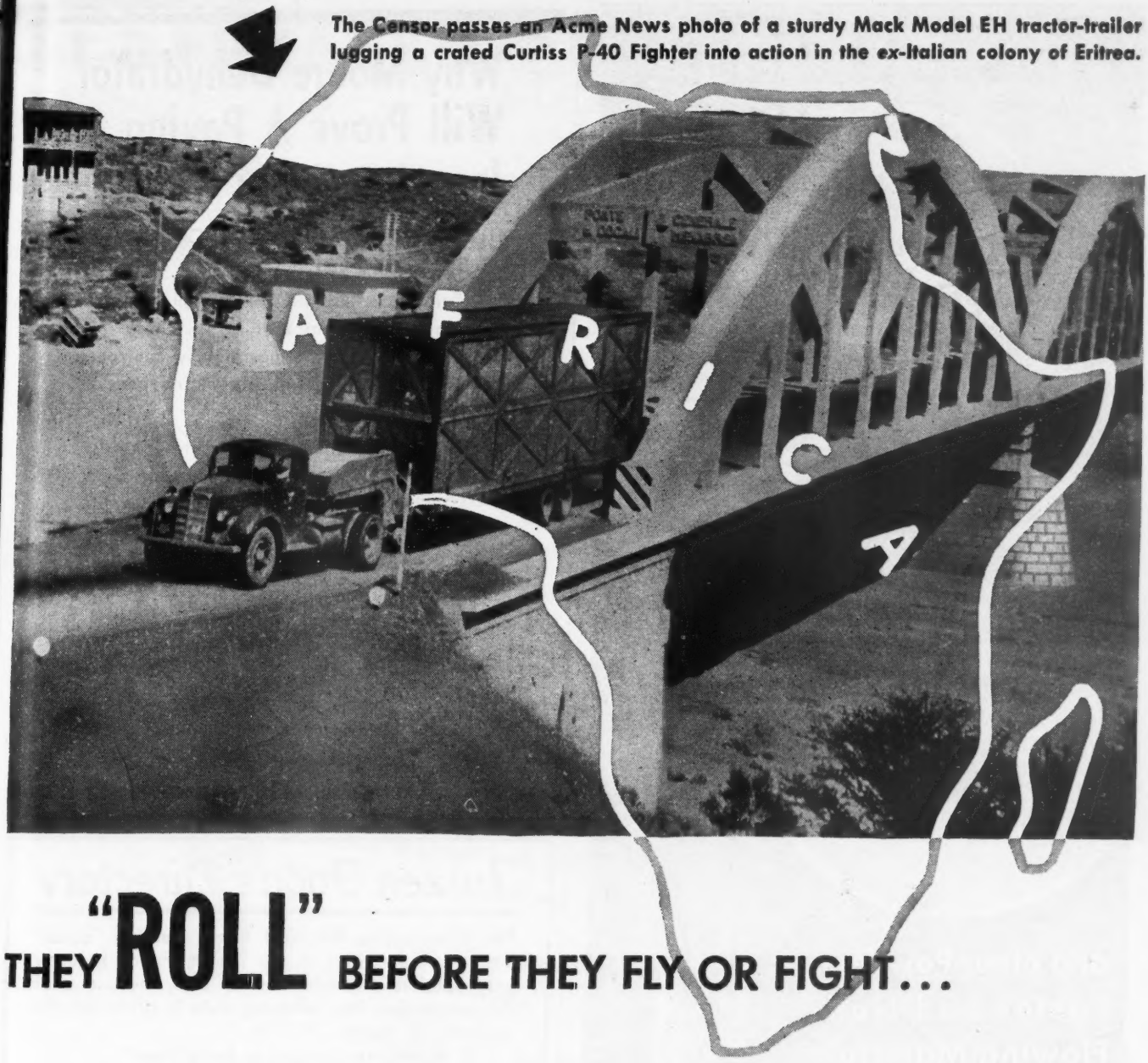
Engineers and Manufacturers of Equipment for Vacuum and Atmospheric Drying, Compressing and Debulking of Food Products

F.J.Stokes **PROCESSING EQUIPMENT** FJS Est. 1895

The Censor passes an Acme News photo of a sturdy Mack Model EH tractor-trailer lugging a crated Curtiss P-40 Fighter into action in the ex-Italian colony of Eritrea.



"THEY ROLL" BEFORE THEY FLY OR FIGHT...

The average man in the street is apt to think of the air achievements of our day in terms of 50,000 foot ceilings and better than 400 mile-an-hour air speeds. But as everyone interested in truck transportation knows, something important, too, takes place on wheels before any plane leaves the ground.

Trucks help build those planes. Trucks like Macks haul raw materials and parts and even complete planes to and from aircraft factories.

Trucks help build airports. Macks are doing the heavy work in airport construction in many parts of the world. Mack "tankers" haul gas and oil to "keep 'em flying" once the airports are in service.

The fact is, the wheel is still the most useful invention ever made by man. And for 43 years nobody has put the wheel to better use in truck transportation than Mack.

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TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

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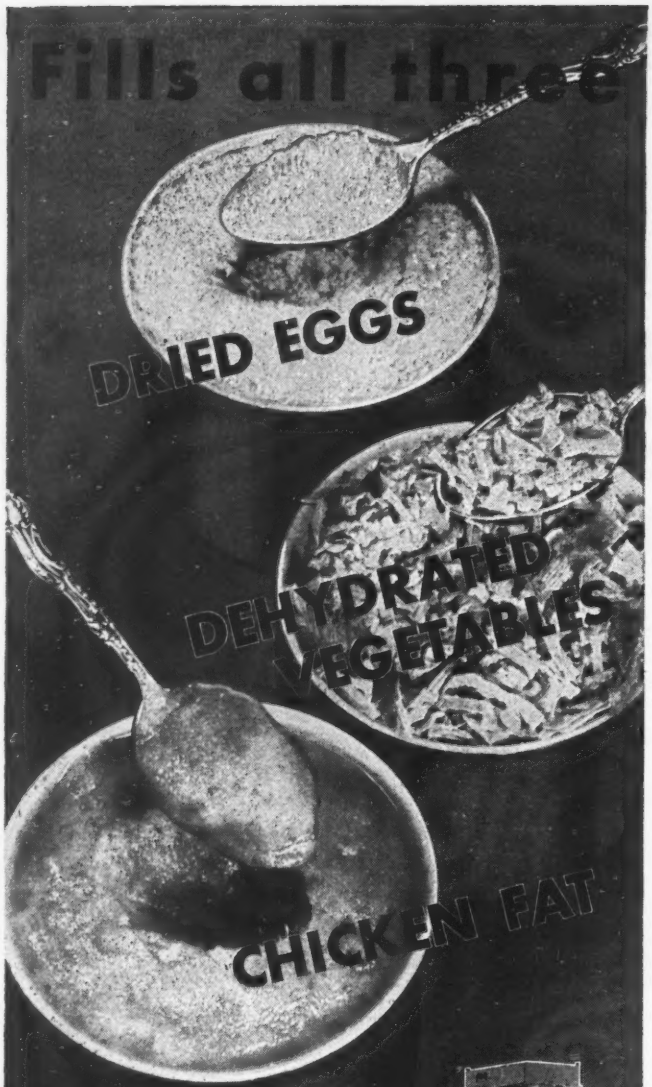
Mack Trucks, Inc., Long Island City, N. Y. Factories at Allentown, Pa., Plainfield, N. J., New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.

IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!



and other Powders, Pastes and Non-Flowing Materials

S & S

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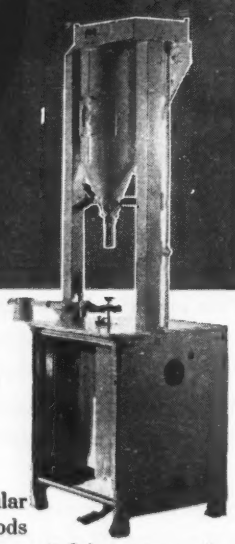

handles not only powdered and granular materials of all kinds, but paste foods such as peanut butter, deviled ham and fish paste, and products such as corned beef hash, mince meat, caviar, etc. . . . filling cans, jars, bags or cartons from ½ oz. to 5 lbs. at speeds ranging from 15 to 30 per minute. Auger feed fills by gross weight, volumetric measurement, or pressure packing from bottom up (usually recommended for paste foods). *Folder fully describing Universal Filler features will be sent free upon request on your letterhead.*

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Why Moore Dehydrator Will Prove A Paying Investment For You

(1) Short air travel directed CROSS-WISE dehydrator, and automatically reversible.

(2) Automatic "Zone Control" full length of dehydrator: Temperature, humidity and circulation are thermostatically controlled at each dehydrating stage, independent of adjoining zones.

(3) Flexible operation and accurate control of conditions makes Moore Reversible Cross-Circulation Dehydrator adaptable for variety of foods and any required capacity. More than 60 years experience designing and manufacturing efficient dryers. Write today.

MOORE DRY KILN COMPANY

Jacksonville, Florida
Vancouver, B. C., Canada
North Portland, Oregon

Frozen Foods Directory

This Directory is the most comprehensive "quick" picture of activities in the Frozen Foods Industry yet published. In addition to listing the names of the companies, the following data is given for the majority of them:

1. ***WHERE* the freezing is being done!**
2. ***HOW* it is being done — what system is used!**
3. ***WHAT* products are being frozen!**
4. ***BRAND NAMES* of frozen foods!**
5. ***THE TYPE* and size of containers and packaging materials being used!**
6. ***The QUANTITIES* frozen in the past!**
7. ***THE SCHEDULED PRODUCTION* for the future!**

If you want to know what's going on in the Frozen Foods Industry—see this "Frozen Foods Directory." Now available at 35¢ per copy.

Note—10 or more copies to one address—25¢ each

FOOD INDUSTRIES

Department FD

330 West 42nd Street, New York, N. Y.

DEHYDRATED FOOD SURVEY #2

Continuing its studies of products and markets in a swiftly changing world, The Evening Bulletin now has completed its 2nd survey on consumer acceptance of dehydrated soups and foods in the Philadelphia shopping area.

This survey covers 1294 personal interviews. Here are some of the pertinent questions that are answered:

- **Do housewives know what dehydrated means?**
- **How much confusion is there between dehydrated foods and frozen foods?**
- **Is there confusion of dehydrated foods and dried foods?**
- **To what extent are dehydrated foods considered substitutes for canned foods?**
- **Do directions on the dehydrated foods packages give enough information?**

NOTE — Copies of this 2nd Dehydrated Food Survey are available to any interested company. Just address: The Evening Bulletin, Philadelphia, Pa.

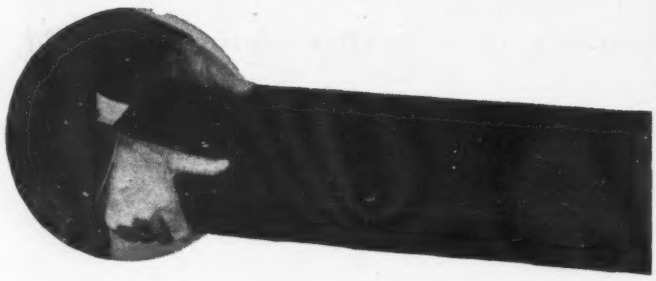
WHERE PHILADELPHIA HOUSEWIVES SHOP FOR FOOD

When 16,409 customers of Philadelphia super markets, chain and independent stores were asked by Fact Finders Institute: "Check the one newspaper in which you are most likely to look for food advertising," *80% of them named The Evening Bulletin.*

The Evening Bulletin, with its daily circulation of over 600,000 copies, is *the* food marketplace of Philadelphia housewives.

In Philadelphia — nearly everybody reads The Bulletin

No critical construction material needed



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YOU CAN build strong, self-supporting walls with efficient Novoid Mineral Wool Board — no metal or wood is needed! And because this low-cost insulation is easy to erect, you save man-hours as well as construction materials.

You get high insulating efficiency too, for tests of average material show a low thermal conductivity of less than .33 at 75°F. In this and in other respects, Novoid Mineral Wool Board equals or excells Federal Specification HH-M-371 for board or block form insulation. And it's moisture-proof. Both the mineral wool fiber and the asphaltic binder—from which these strong, homogeneous boards are processed — are waterproof.

In addition, Novoid Mineral Wool Board has no objectionable odor or liability to decay, mold, attract or harbor vermin. It is available in "American Standard" size, 12″ x 36″ in thickness of 1″, 1½″, 2″ and 3″.

NOVOID CORK INSULATION AVAILABLE

An ample supply of cork is available, and Novoid Corkboard and Cork Covering can now be used on all low-temperature construction *without restriction.* For complete facts about Novoid Corkboard and Mineral Wool Board, write today to Cork Import Corporation, 330 West 42nd Street, New York City.

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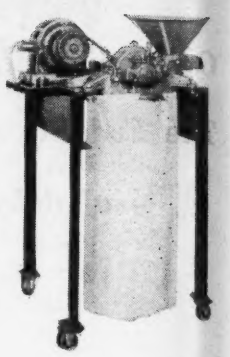
OUR PERFORMANCE GUARANTEE

covers the ability of Mikro-Pulverizer to produce the *results* you expect.



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Get more out of YOUR Containers by putting more into them with

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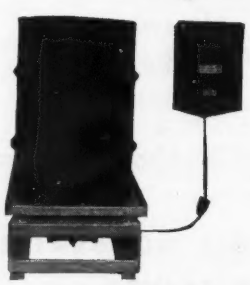

High-Speed Electric

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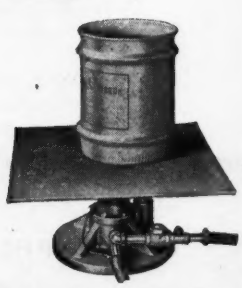
3,600 vibrations per minute —rheostat controlled power for variable adjustment to meet material requirements. Capacity from large barrels to small containers.



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Catalog literature available.

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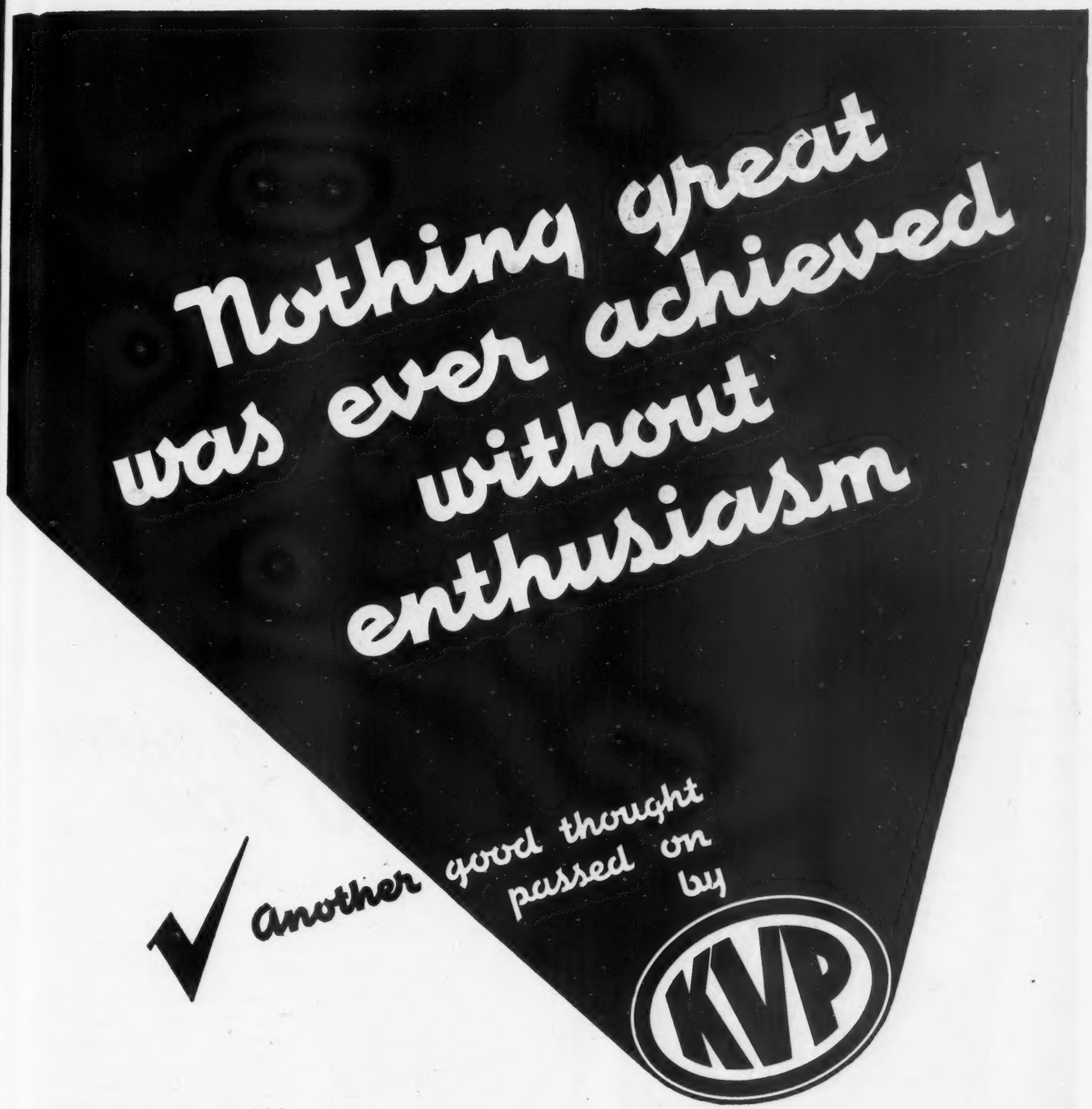

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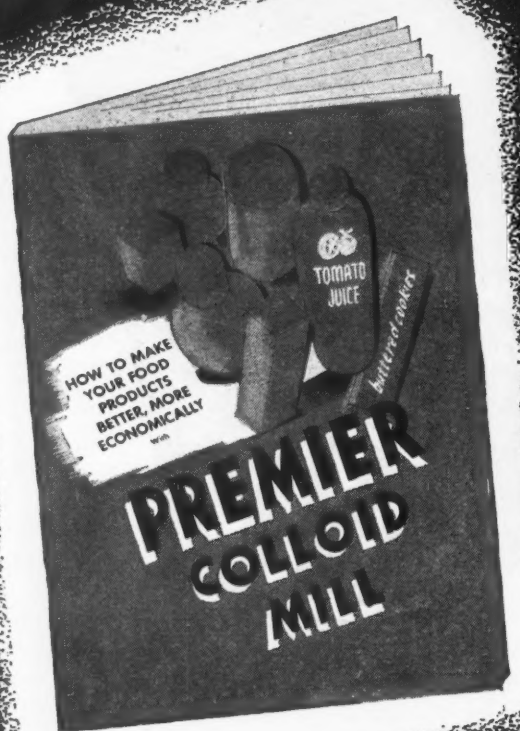
PARCHMENT, KALAMAZOO, MICHIGAN
BRANCH PLANTS IN PHILADELPHIA, PA., AND HOUSTON, TEXAS

Everyone concerned with FOOD PROCESSING *Will want to Own This Brochure*



A study of the value of colloidal dispersion applied to many phases of food and beverage production. If your finished product goes through a grinding, emulsifying, dispersing or disintegrating process, send for your free copy of this brochure now. No obligation of course.

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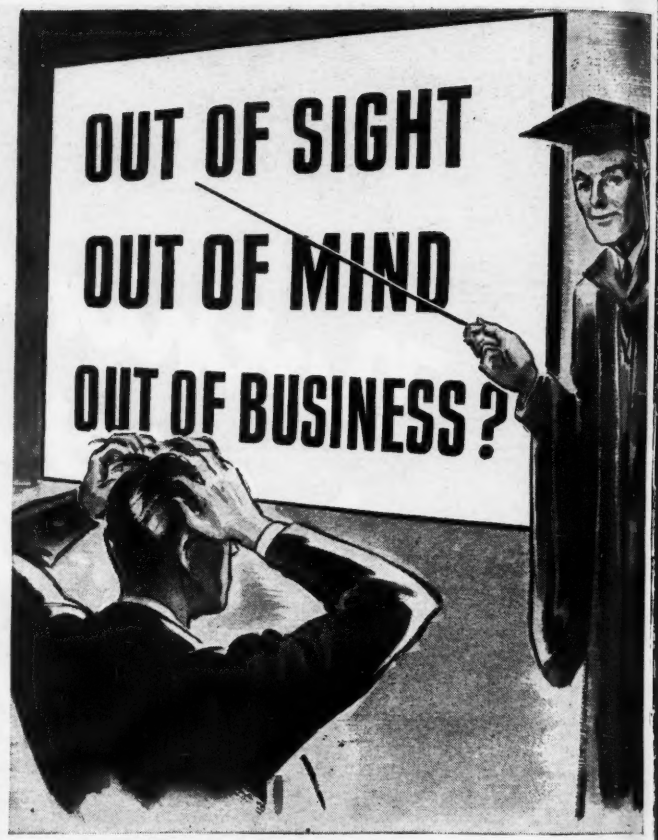
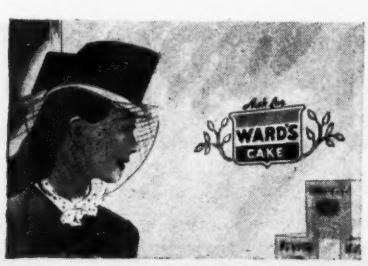


DON'T LET IT HAPPEN TO YOU

Don't let your advertising "take a rest" for the duration. Consumer memories are short. If you can't deliver the goods . . . deliver a message. Keep million dollar trademarks alive on "Main Street" at "penny costs" with Meyercord Decal Window Signs and product identification.

Meyercord Decals require no essential metals. Decal spot window and door signs, trademark and product reproductions, window valances, back bar, mirror and display case signs provide colorful, constant reminders of your desire to sell and serve. They're durable, washable, easy to apply and inexpensive. Millions now in use. Send for complete details. Don't let "out of sight—out of mind" endanger your business! Address Department 1235.



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50th anniversary 1942
DECALS SAVE METAL

FAST • COLORFUL • DURABLE IDENTIFICATION

MEYERCORD DECALS

THE MEYERCORD CO., 5323 W. Lake St., Chicago, Ill.

STANDARDS FOR *Selective Shopping*

THE label on a garment which reads "100% Virgin Wool" provides the selective shopper with a standard by which to evaluate similar merchandise of various grades. Likewise, the food shopper of today has a standard of comparison—the label statement telling of the extent to which food products have been improved nutritionally by the addition of essential vitamins and minerals.

The American housewife has applied selective shopping to foodstuffs in greater degree than ever before. Shortages and rationing have caused her to make comparisons and buy the product which gives her the best possible food value for her money. Your label description of vitamin and mineral content is receiving its full share of attention.

It is usually not difficult nor expensive to ensure the competitive position of your product by vitamin fortification. The Merck technical staff and laboratories offer assistance in perfecting such factors as adequate distribution and retention of the vitamins, and product control methods.

Let us help you make your product a standard for selective shoppers.

ARMY E NAVY
Buy WAR BONDS FOR VICTORY

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FINE CHEMICALS FOR THE PROFESSIONS AND INDUSTRY SINCE 1818

MERCK & CO., Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

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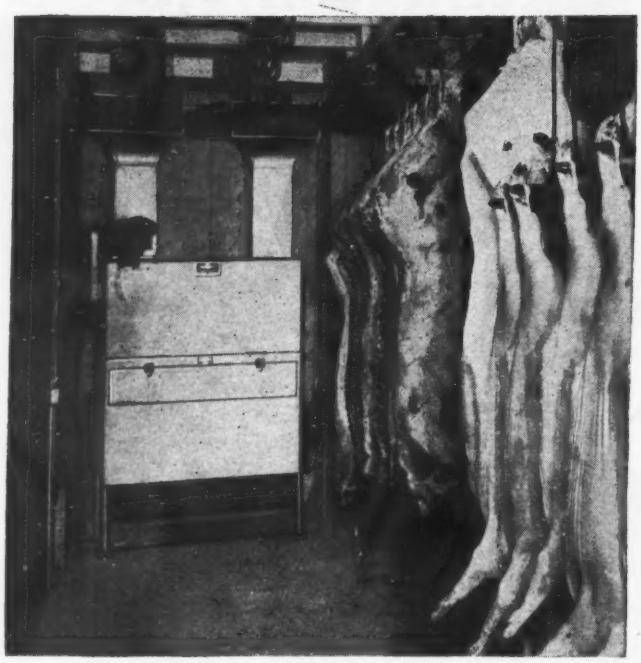
In Canada: MERCK & CO. Limited, Montreal and Toronto

Keeping Constant Low Temperatures in Refrigerated Rooms by the NIAGARA "No Frost" Method... *Saves Compressor Capacity and Power*



PATENTED

● The NIAGARA "No Frost" System provides a more reliable method for obtaining...

1. *Extreme low temperatures in cold room.*
2. *Greater economy in refrigerating large spaces below freezing temperatures.*
3. *More dependable control of temperatures for better handling of perishable foods.*

NIAGARA "No Frost" System eliminates icing of cooler coils and shut-downs for de-icing. It gives increased capacity from compressors and increased refrigerated space from the same compressor equipment.

The NIAGARA "No Frost" Method has been thoroughly proven by practical experience for years of plant operation. Write for complete information and Niagara Bulletins 83 and 95. Address Department FI-53.

NIAGARA BLOWER COMPANY

General Sales Office: 6 E. 45th Street, New York City

37 W. Van Buren St., Chicago — Fourth & Cherry Bldg., Seattle

District Engineers in Principal Cities

NIAGARA *INDUSTRIAL* COOLING • HEATING • DRYING HUMIDIFYING • AIR ENGINEERING *EQUIPMENT*

FULLERGRIPT BRUSHES

MEET THE NEEDS OF DESIGNERS, BUILDERS AND USERS OF MACHINERY IN THE FOOD INDUSTRY

FULLERGRIPT Brushes for
BAKERIES
DAIRIES
FLOUR MILLS
MEAT PACKING
FRUIT GRADING
CANDY—ETC.

TO manufacturers and processors of Food: Wherever you use Brushes, consider Fullergript's enduring construction. Conveying equipment, wrapping and packaging, bottling and labeling machinery operate more efficiently with these sturdy, long wearing Brushes.

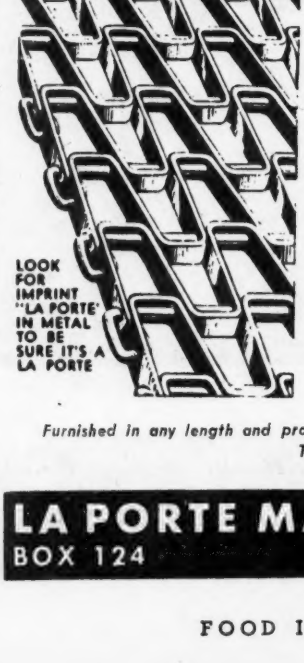
Also try our standard line of Floor Brushes, Dusters and the famous FULLER FIBER Broom.

The FULLER BRUSH Company
Industrial Division, Dept. 8C
3592 MAIN STREET · HARTFORD, CONN.

LA PORTE

FLEXIBLE STEEL CONVEYOR BELTING

FIGHTS WASTE IN EVERY PROCESS



LOOK FOR IMPRINT "LA PORTE" IN METAL TO BE SURE IT'S A LA PORTE

SAVES TIME • LABOR MAINTENANCE and PROTECTS PRODUCTS

The most efficient, practical and economical conveyor belting for Pickling, Canning, Freezing and Dehydration. On grading, sorting and picking tables, also in scalders, washers, cookers, elevators, etc.

Will not creep, weave nor jump, is easily and quickly installed, and readily sterilized with a steam gun or scalding water. The open mesh feature permits the circulation of air around products in process.

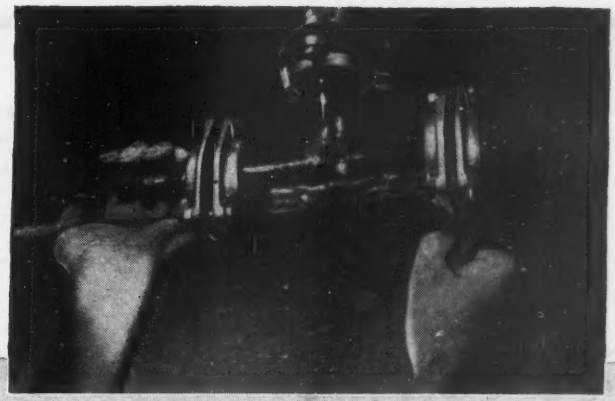
Furnished in any length and practically any width. Ask your Supplier TODAY.

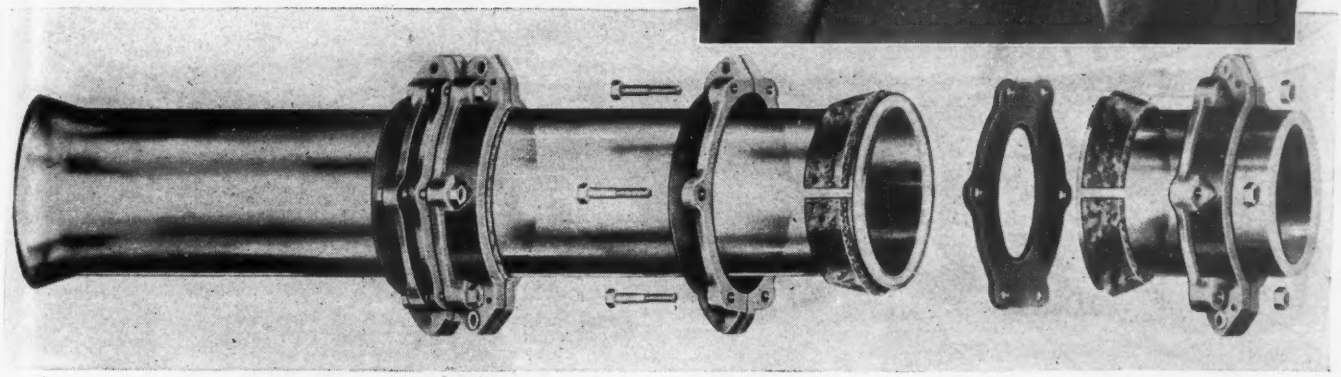
LA PORTE MAT & MFG. CO.
BOX 124 — LA PORTE, INDIANA

What every plant operator should know about GLASS PIPING!

Q: Is GLASS PIPING easy to install?

A: Yes!





Blown-up view of 4" PYREX Piping and flanges.

Whether you need a single length or an entire piping system, PYREX Piping is easy to install. In many instances mechanics with no previous experience have done first-rate installations with PYREX Piping. Your present plant workmen can do it.

Fittings are available for joining PYREX Piping to existing lines and equipment. Metal to glass and glass to glass fittings are easily assembled. PYREX Piping is hung and supported much like other types of piping. A few simple precautions such as padding supports and hangers to minimize scratching will assure long life.

The large photograph above shows the few simple parts used to make a sturdy joint in PYREX Pipe Lines, as illustrated in the smaller picture.

IS GLASS PIPING AVAILABLE NOW?

Yes. Glass-making materials are fairly plentiful. We do need priority ratings that enable us to get accessories (flanges, gaskets), to assign necessary labor, and to establish your order in our production line. With such priorities we have been making 6 to 8-week deliveries.

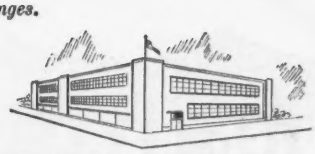
Available sizes and lengths: 1", 1½", 2", 3", and 4" diameters; any length from 6 inches to 10 feet (longer lengths on special request). There are corresponding ells, tees, return bends, and reducers.

Accessories: Compression type joints—with conical pipe ends compressed to a self-centering gasket by metal flanges and clamping bolts. We supply gaskets of materials suited to the liquid or gas you want to convey.

WHAT DOES IT COST?

The initial cost of PYREX Piping (accessories included) is about the same or less than the cost of full-weight copper or brass piping, in comparable sizes, and is considerably less than the cost of stainless steel.

And because PYREX Piping does not wear out under acid attack, it gives long trouble-free service, with resultant low long-time cost.



WHERE DOES IT GIVE BEST SERVICE?

Wherever speed and ease of cleaning are factors . . . wherever products must be protected from contamination . . . wherever it is important to know what is happening *inside* a line . . . there it is that PYREX Piping gives you its most profitable service.

Food and beverage plants use it to eliminate their corrosive problems, just as it is the first choice of chemical plants because it resists all hot or cold acids (except HF). It can be cleaned by simple flushing or with steam or strong hot cleaning solutions. PYREX Piping helps to produce a purer product with the most natural color and flavor.

WILL IT STAND UP MECHANICALLY?

Yes. PYREX Piping is recommended for working pressures up to 100 lbs. p. s. i. But glass in this form is *not* as strong as metal. So, care must be taken to avoid installation strains or sharp impact. Nearly 20 years of service under all kinds of plant conditions have proved that only simple common sense and reasonable care are required to handle PYREX Piping without trouble. The glass itself, incidentally, is very hard—about twice as resistant to abrasion as ordinary plate glass. Thus, the piping is particularly suitable for abrasive, corrosive slurries. You can install and use PYREX Piping with confidence.

WATCH FOR CORNING ADVERTISEMENTS!

Watch this magazine for more information in Corning's advertisements headed "What every plant operator should know about Glass Piping." And Write for PYREX Piping Bulletin No. 814. Industrial Division, Corning Glass Works, Corning, N. Y. Branch Offices: New York, 718 Fifth Ave.; Chicago, Merchandise Mart.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass
BRAND

BAGS TO RESIST "AIR ATTACK"

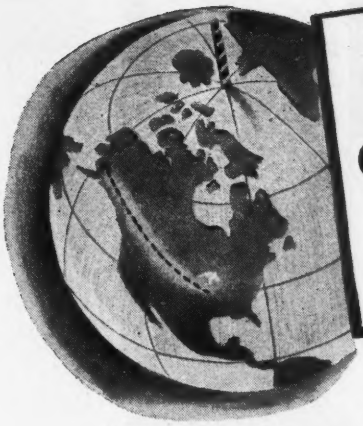
VARIED BAGS *for* VARIED USES

Laminated Cellophane Bags, heat-sealing, have exceptional protective properties. The Army 5-in-1 Ration, Ration "K", and dehydrated foods for Lend-Lease are hard-to-keep products packaged in these bags. A 2-ounce laminated bag of *Cellophane and Glassine* is used to carry soup mix in a special American Red Cross Package—ideal for safe shipments of food concentrates and powders in small units. Two special laminations, *Cellophane-Glassine* and *Cellophane-Kraft*, are doing special bag-packaging jobs for the Quartermaster Dept. and the U. S. Dept. of Agriculture. Millions of pounds of frozen foods this year will be protected by another Menasha bag — *high wet-strength stock*, a *special coating* for protection, heat-sealing. The range of Menasha's papers, laminations and sizes includes a perfect bag for any number of "problem products."

It is not "coincidence" that Menasha bags are meeting unusual packaging requirements for so many wartime products. This record begins with a skilled technical staff, excellently equipped and fully experienced for package research and development. Flexible production equipment permits work in a great range of papers, cellulose sheets, combinations and laminations, glue and heat-sealed construction. Our booklet "Wartime Packaging" tells much about the "know how" which Menasha has ready to tackle your bag-packaging job. Write for it now.

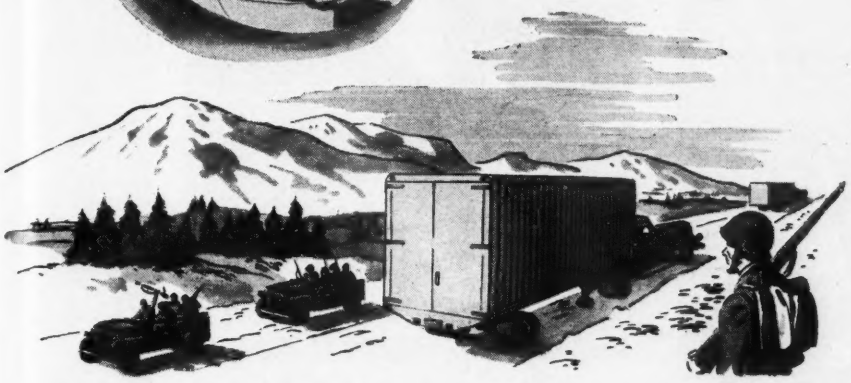
THE MENASHA PRODUCTS CO.
Division of Marathon Paper Mills Co.
MENASHA, WISCONSIN

MENASHA PRODUCTS
CARTONS, LINERS
BAGS AND OVERWRAPS



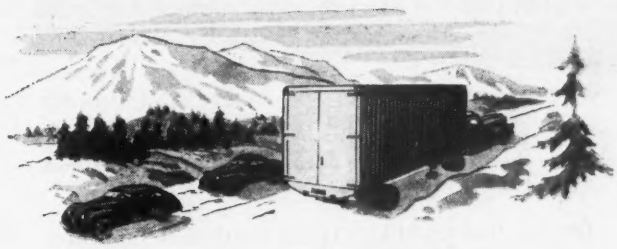
Short Cut to Tokyo

VIA THE ARCTIC CIRCLE



Alaskan "sourdoughs" said it couldn't be done when they heard that a modern, two-lane highway was proposed that would connect their ice-bound frontier with the industrial cities of the United States.

But the great Alcan Highway is finished! . . . A 2,000 mile engineering "miracle" that dropped weeks from an "impossible" schedule. Today, trucks and trailers are rolling on this great highway, "highballing" supplies and munitions to air bases within bomber range of Japanese territory.



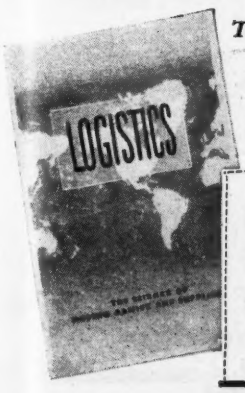
And in 194–? the Alcan Highway will be ready for a peacetime job. And so will Trailmobiles—the new, post-war Trailmobiles—carrying supplies and materials that this fast-developing frontier of America will demand.

In solving the problems of how to keep supply channels open to modern, fast-moving armies, facts are being uncovered . . . facts that will doubtless have important commercial applications. Much of this information is now set forth in a booklet entitled "Logistics—the Science of Moving Armies and Supplies." A copy is available, free of charge, to persons now engaged in the transportation of freight and merchandise.

TRAILMOBILE

ARMY E NAVY

Tomorrow's Trailmobiles are being built on the battle-fronts of today



THE TRAILER COMPANY OF AMERICA
Cincinnati, Ohio Branches in All Principal Cities

Send for this free booklet!

Pin this to your company letterhead and mail today for your *free* copy of "Logistics—the Science of Moving Armies and Supplies."

*Name*_____ *Position*_____

NOTICE: Distribution of this book is restricted to persons now actively engaged in the transportation of freight and merchandise.

STOP Trailer Tail Lights

The Alcan Highway goes through country that was once labeled "impassable" to dog teams.

There are over 300 trailers organic to a complete Infantry Division of the U. S. Army.

When roads now under construction are completed, it will be possible to drive from Nome, Alaska, to Buenos Aires.

One of the wartime Trailmobiles carries two complete pontoon boats and equipment weighing over 20 tons.

There are more than 5,000,000 vehicles in U. S. truck fleets, more than all the rest of the world combined.

We manufacture cold to prove ROCK CORK'S efficiency

A VIEW OF THE JOHNS-MANVILLE "COLD ROOM" where insulations for service in the low temperature range are tested. The temperature in this room can be automatically regulated and kept constant.

In the JOHNS-MANVILLE insulation laboratories—among the best equipped in the world—specially trained technicians subject low temperature insulation materials to conditions even more severe than they will have to face in actual service. J-M Rock Cork, widely used in low-temperature insulation service, meets the most exacting tests of these laboratories.

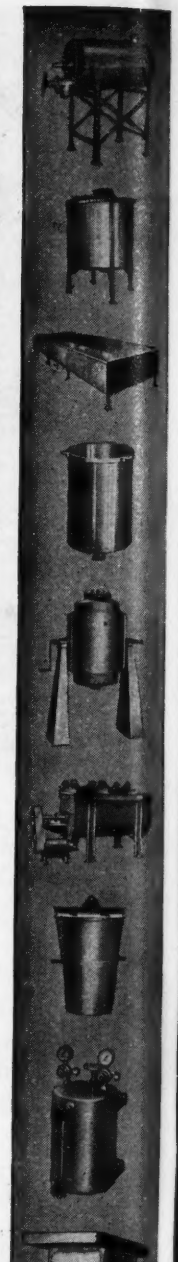
Formed by an interlacing of mineral fibers, J-M Rock Cork is exceptionally successful for all kinds of cold-storage construction. Factors responsible for its wide use are low conductivity at low service temperatures, non-absorption of moisture and odor, and immunity to termites, vermin and mold. Available in sheets and as sectional pipe covering. For full details, write Johns-Manville, 22 E. 40th St., New York, N. Y.

JM

Johns-Manville

ROCK CORK

THEY'RE CALLING AMERICA THE FOOD-BASKET OF THE WORLD
OUR PLANT IS SPEEDING DELIVERIES TO HELP FILL THAT BASKET-THANKS TO KOVEN EQUIPMENT!



KOVEN INDIVIDUALIZED FOOD EQUIPMENT ASSURES EFFICIENT, ECONOMICAL PRODUCTION

Today, American food production is geared to a greater volume, a greater speed than ever before!

In many cases, this pressure of increased orders brings with it new and difficult equipment problems . . . problems *that must be overcome* if efficiency and economy are to be maintained in the plant.

KOVEN'S reputation has been *built* on solving these *individualized* equipment problems when they arise . . . for more than 50 years we have been producing equipment to specification to meet the particular needs of the food manufacturer.

Perhaps you are planning certain equipment changes for today or for the future. If so, call in a KOVEN representative for his suggestions . . . there's no obligation.

Among the many KOVEN products:

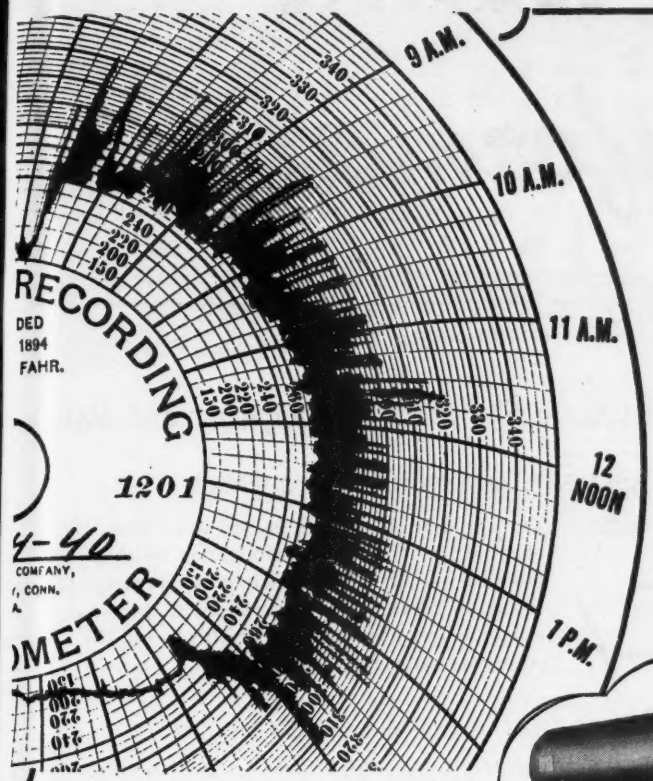
- Stainless Steel
- Aluminum Sheet Fabrication
- Boxes, Tote, Waste Cans
- Chemical Apparatus
- Coils and Pipe Bands
- Copper Sheet Fabrication
- Galvanizing Work
- Mixers, All Kinds
- Monel Metal Fabricator
- Pails, Special Heavy
- Pans, All Types, All Metals
- Sinks, Scullery and Factory
- Tables, Galvanized or Monel
- Tanks, All Types, All Metals
- Kettles, All Types, All Metals

WATERFILM Industrial Heating Boilers

PLANTS:
Jersey City, N. J. Dover, N. J.

L. O. KOVEN & BRO. INC

154 Ogden Ave.
Jersey City, N. J.



This chart shows actual recordings of Boiler Feed Water Temperatures using the ACKER System of steam drainage, deaerating and boiler feeding.

DEHYDRATORS

Condensed & Powdered

MILK PLANTS

and other steam users

ARE *YOU* GETTING THESE

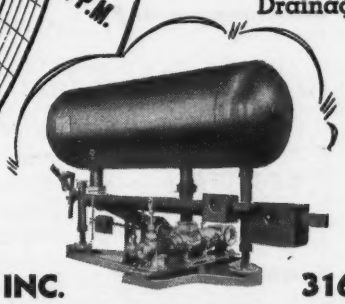
BOILER FEED WATER TEMPERATURES?

If not, why not?

Users report substantial production increases and

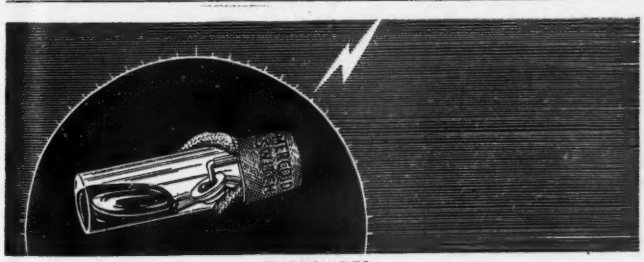
13 TO 27% SAVINGS

in fuel with ACKER Systems of Steam Drainage, Deaerating and Boiler Feeding. All water fed to the boilers through ACKER equipment is deaerated. Write for data today.



Investigate today so you can raise your output and lower your fuel costs tomorrow.

W. M. ACKER ORGANIZATION, INC. **3169 Fulton Road, Cleveland, Ohio**



IT PROVIDES

MILLIONS

OF "MAKES" AND "BREAKS" IN THE ELECTRICAL CIRCUIT

The vital part of any automatic control is the switch. That is why you will find a mercury switch in every Mercoid Control.

Mercury switches, made the Mercoid way, assure unfailing performance under all operating conditions. They are never affected by such deteriorating elements as dust, dirt, moisture or corrosion. Nor are they subject to such contact troubles as oxidation, pitting or sticking of contacts.

A mercury switch made the Mercoid way, provides an electrical contact designed for millions of perfect operations. That is the answer to the question, why Mercoid Controls have such long life.

MERCOID DA CONTROLS

SOLVE INDUSTRY'S AUTOMATIC CONTROL PROBLEMS

Adaptable as they are to a wide range of applications and available in a variety of types, they are immediately considered wherever accurate control of pressure and temperature is necessary.

Years of experience and engineering development are built into Mercoid DA Controls. They have become and will continue to be a symbol of instrument dependability.

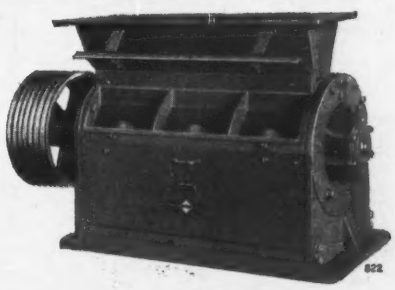
Complete information in Mercoid Catalog, No. 600, write for a copy.

THE MERCOID CORPORATION
4203 W. Belmont Avenue. Chicago, Ill.

EUREKA

'Sharpcut Cutters'

Rotary Action



Simple Safe

Large Small-cost Capacity

Rapid, clean-cut cutting: keen-edge knives that cut sharply—saving product, saving power and lowering operating cost. Super-built, accessible, closely regulated. Fast, uniform cutting for drugs, spices, herbs, vegetable roots, stems, hulls, beans, peas, cork, charcoal, paper, etc. . . . Takes small space, little attention. . . . Made in several sizes.

Ask for Catalog I-167

S. Howes Co., Inc., Silver Creek, N. Y.

QUICK AND COMPLETE

Buying Information

I LOOK HERE FIRST . . . "The Food Industries Catalogs and Directory is in almost constant use. I look here first to save time in getting dependable information."

★

"The Food Industries Catalogs and Directory was used as a general reference book and guide. This organization is now purchasing from most of suppliers listed."

H. G. Myers, Purchasing Bureau Buyer, Quality Bakers of America, New York, N. Y.

"In view of our diversified and extensive operations we use many different kinds of equipment. As time goes on will use even more. Should like to see continued and expanded when convenient to do so."

F. W. Fetterman, Superintendent, Libby, McNeill & Libby, San Francisco, Calif.

"We often use Food Industries Catalog and Directory as a reference book when we are in doubt about a piece of machinery and we find the reference section of the book very valuable."

G. C. Freeley, Manager, Neosho Valley Cooperative Creamery Assn., Erie, Kans.

". . . and find it extremely useful. One of the valuable features to me is the complete set of definitions and standards for food products adopted under the Food, Drug and Cosmetic Act up to the time of publication of your book."

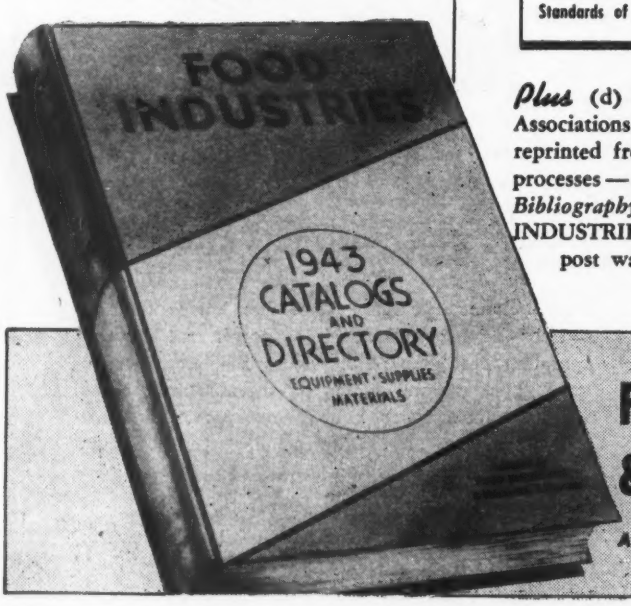
F. C. Blanck, Quality Control Dept., H. J. Heinz Co., Pittsburgh, Pa.

". . . would say that your 1942 Catalog and Directory has been in constant use by our organization."

L. E. Malcom, Canned Meat Production Dept., Kingan & Co., Indianapolis, Ind.

"We found the Food Industries Catalog & Directory valuable in our office and have passed on some of the formulas listed therein to our bakery trade. Kindly include us on your list for 1943 edition."

George Cockburn, Central Mercantile Co., St. Joseph, Mo.



Use your F. I. C. D. to find Facts on Equipment and Materials

FACTS ON EQUIPMENT, MATERIALS AND SUPPLIES:

SECTION 1
Single and Multi-page Manufacturers' Catalog Data

Turn to Section one — here are more than 100 pages of manufacturers' catalog information which picture and describe the products of leading suppliers of the Food industries. These pages give you sizes, speeds, capacities and other performance data which you can use to speed your production, cut costs.

TO FIND THE FIRMS THAT MAKE A CERTAIN PRODUCT:

SECTION 2
Classified Directory of Manufacturers

Here is the list of all manufacturers of machinery, equipment, and supplies. The names are classified alphabetically by product, with catalogers names in bold face type, giving page reference to the catalog section.

You will find more than 500 products used in the processing of foods. (In using this section always look for the principal word such as "Filter", "Mixers", etc.)

NAME AND ADDRESS OF MANUFACTURER:

SECTION 3
Alphabetical, Company Name, Address and Trade Name Index

A complete alphabetical listing of the companies making the products which are listed in Section 2. This gives a cross-index and further simplifies the use of the volume.

FACTS ON LEGAL ASPECTS OF YOUR PRODUCT:

SECTION 4
Food Definitions and Standards of Identity

The 4th Section is valuable for reference. (a) Here are given Government definitions and standards of identity for foods. (b) List of Federal laws affecting foods, with the names of enforcement agencies. (c) Geographic list of State Food Law Enforcement Agencies.

Plus (d) *National and Regional Trade Associations* as well as State and Local Associations. (e) *Food formulas* — over 200 of them for many varieties of products, reprinted from FOOD INDUSTRIES. (f) *Flow Diagrams* of 20 important food processes — through the stages of preparation, processing and packaging. (g) *Bibliography of Articles on Dehydrated Foods* which have appeared in FOOD INDUSTRIES. This is of particular war time interest and gives a forecast of post war sales opportunities as well.

FOOD INDUSTRIES CATALOGS & DIRECTORY 330 W. 42d ST., NEW YORK, N. Y.

A UNIT OF THE McGRAW-HILL REFERENCE SERVICE

FOOD DEHYDRATORS, Attention!

H. C. BAXTER & BRO.

A PARTNERSHIP

OVER 50 YEARS CANNERS BAXTER'S FINEST BRUNSWICK, MAINE, U.S.A.

March 10, 1943

Proctor & Schwartz Inc.,
7th St. & Tabor Road,
Philadelphia, Penn.

Attention: Mr. A. O. Hurxthal,
Vice President.

Dear Mr. Hurxthal:

We have had your continuous Vegetable Dryer in operation for three months. In that this was to us a new enterprise, and one about which so little definite information was available, it was not to be wondered at that we had many problems to solve. You will be glad, I am sure, to learn that while none of us yet claim to be "experts", nevertheless most of the answers to these problems have been found, and altho undoubtedly we will continue to improve our technique, we are today efficiently producing a highly satisfactory product.

When we entered into contract with you last July, you made certain guarantees concerning the performance of your Dryer. To date the Dryer has exceeded its guaranteed performance. You claimed that because of the automatic features of the Dryer our labor cost of operating would be low. The statement you made at our first meeting in Portland to the effect that "the only thing Proctor & Schwartz didn't furnish was a rocking-chair for the operator of the machine to sit in!" was indeed prophetic. You also indicated a willingness to assist us in developing a satisfactory operation of our whole Dehydration setup. You and your men have been of incalculable assistance in solving many of our problems and we owe you a debt of gratitude for your exceedingly effective co-operation. This has played no little part in enabling us to be the first in this section and one of the first in the country actually to produce food which is essential to the prosecution of this war.

RUPERT H. BAXTER
JOHN L. BAXTER
BRUCE H. M. WHITE
F. WEBSTER BROWNE

We feel extremely fortunate in having made the decision to purchase our first dehydration equipment from you. We believe Dehydration of Food will prove to be not only an important factor in the winning of this war but that it will favorably affect the eating habits of many peoples all over the world in the years to come. As we need and can use additional equipment we will automatically turn to you and feel certain that you will have or will make for us what we need. We will continue to refer to you and your staff questions that bother us, tho we hope it will not be necessary to take undue advantage of your kind offer of consultation service.

Sincerely yours,

H. C. BAXTER & BRO.

F. Webster Browne

PROCTOR & SCHWARTZ • INC • PHILADELPHIA

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

10 cents a word, minimum charge $2.00.
(See ¶ on Box Numbers.)
POSITIONS WANTED (full or part-time salaried employment only), ½ above rates.
PROPOSALS, 50 cents a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.
DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

The advertising rate is $6.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.I.

NEW ADVERTISEMENTS received by 10 A.M. April 22nd will appear in the May issue, subject to limitations of space available

POSITIONS VACANT

PICKLE MAN—Must be thoroughly experienced in brining and processing to finished product. Good position with excellent future. Goodman Bros., 24 Miller St., Meriden, Conn.

WE MANUFACTURE Soup Meal, Cracker Meal, and Sausage or Meat Meal. We supply soup and sausage manufacturers with this product. We want an experienced Superintendent, Foreman, or Chemist who thoroughly understands mixing this Meal with Soups, Sausages, and Meats to take charge of this department. Permanent position. Attractive salary and expenses. Entails traveling and demonstrating to packers and soup manufacturers. Excellent opportunity for ambitious, energetic worker who is looking for attractive compensation and future. All replies or applications will be treated confidentially. Address replies to Mr. E. F. Chambless, Consolidated Biscuit Company, 1465 West 37th Street, Chicago, Ill.

WANTED—Man to supervise and take charge of maintenance and repair work in large dry milk plant. Plant does not generate own power. Will have charge of firemen and engineers and all maintenance men. 24 hour operation, 7 days per week—responsibility. Good salary and permanent position for proper man. Must have Engineer's license. P-134, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

FOOD TECHNOLOGIST. Graduate from leading University. Protestant. Married, age 44. Twenty years experience in food research including eleven years director food research Government filed station. Numerous publications including two technical books. At present employed in administrative capacity. Good reason for desiring change. Present salary $5000. PW-135, Food Industries, 330 W. 42nd St., New York, N. Y.

EXECUTIVE FOOD TECHNOLOGIST: 6½ years University Education in Gen. Agr., Bus. Adm., Sciences. Pract. training in Gen. Agr., Food Mfg., Food Merch., new food Prod. Develop. Ex-Prof., Food Tech., Recognized expert on flavor. 17 years a travelling consultant to every known branch of Food Industry in Mfg., problems, Merch., New Food Prod., Personnel training, Labor Relations prob. of all kinds, servicing some of the largest Corp., in U. S. A. & Canada. PW-136, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

TECHNOLOGIST with SB degree in Food Technology and four years experience in analysis and inspection of canned foods desires position in quality control or production of canned or frozen foods. Married. Eastern location preferred. PW-137, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

EXECUTIVE—Man of wide experience in governmental regulations, taxation, corporate and labor problems. Desires executive position with industrial or commercial organization; age 39; married, 2 children; graduate Columbia College and Columbia Law School; New Jersey Attorney; engaged in active practice 13 years. PW-138, Food Industries, 330 W. 42nd St., New York, N. Y.

FOOD CHEMIST, seven years research production control and supervision in food manufacturing, draft 2A, desires war-essential and permanent position. PW-141, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED

NAILING MACHINES WANTED — We want Morgan or Doig Nailing Machines at once. State make, size, best cash price. Chas. N. Braun Machinery Co., Fort Wayne, Indiana.

Buy War Bonds to Save America

AND

SAVE TIME TO SAVE AMERICA

BUY "CONSOLIDATED"

- 2—Pneumatic Scale Packaging Units.
- 1—Pneumatic Scale Automatic Wax Liners.
- 2—300 gal. Copper closed tin-coated Tanks.
- 1—J. H. Day #2 Brighton Mixer, 80 gal. cap.
- 6—8 to 40 gal. Pony Mixers.
- 15—Dry Powder Mixers, from 50 to 4000 lbs.
- 1—National auger type auto. Powder Filler.
- 2—60-qt. Century 4-speed Mixers, m.d.
- 1—28"x60" double drum B & C Atmospheric Dryer.
- 1—Buffalo 24" Vanilla Bean Chopper.
- 4—World, 1-Ermold semi-auto. Labeling Machines.
- 2—Karl Kiefer Visse Filling Machines.
- 1—Johnson mod. JA Cellophane Wrapper.
- 11—Filter Presses P & F; Recessed; to 42" Square.
- 2—World Rotary Automatic Labeling Machines.
- 1—Stokes 500 gal. Copper Jack. agitated Vacuum Pan.
- 2—Mechanical 4x9' Lard Rolls, m.d.
- 3—Sweetland Filters, 1—#6, 1—#7, 1—#12.
- 17—Stainless Steel, Copper; Glass Lined; Kettles and Vacuum Pans, up to 550 gal. cap.
- 2—Schultz-O'Neil Pulverizers.
- 1—Pneumatic Scale (Samco Jr.) 8 Spout Vac. filler, M.D.
- 1—Horiz. 8 Spout S.S. Straight Line Vac. filler, M.D.
- 3—K.K. & U.S. Rotary bottle Rinsers, m.d.
- 1—5x35' Louisville Steam Tube Dryer.
- 1—Elgin 12-spout Rotary Piston Filler, S.S.
- 12—Copper Tanks to 7000 gal.
- 1—Johnson T & B Sealer Unit.
- 2—O. & J. 7-place Rotary Labelers, m.d.

• *Send for "Consolidated News" listing complete stock.*

We buy and sell from a Single Item to a Complete Plant

CONSOLIDATED PRODUCTS CO., Inc.

Office, 13-17 PARK ROW N.Y. Shops 335 DOREMUS AVE., NEWARK

Buy With Confidence — "Consolidated"

WANTED

FOOD MANUFACTURING PLANT wanted! Will make cash investment. State details. W-140, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED: Laboratory size 3-Roll Watercooled chocolate coating mill with or without motor. W-139, Food Industries, 330 W. 42nd St., New York, N. Y.

FOR SALE

FOR SALE 2-Fairbanks-Morse, AC, model 36A, Diesel Electric Generating Sets, direct driven. In perfect condition. Now in operation. Inspection by appointment only. Telephone University 4-4250 or write Black & White Corp., 574 West 130th St., N. Y., N. Y.

FOR SALE. Will sell used Sauerkraut Shredder (J. E. Smith), good condition, extra cutter, $200.00. S. E. Mighton Company, Bedford, Ohio.

PRIME LOANS TO
CORPORATIONS—Unsecured
INDIVIDUALS—Collateralized
LARGE Sums—LOW annual rates.
COLLATERAL DISCOUNT CORP.
Graybar Bldg.—New York City

WANTED TO BUY

Food Factory with following or without. Private party. Preferably dessert powders, syrups, extracts.

BO-133, Food Industries
330 West 42nd Street New York City

APPLE CIDER PLANT WANTED!

Will make cash investment. State details.

BO-143, Food Industries
330 W. 42nd St., New York, N. Y.

M.V.P. Glassine Available

Small quantities monthly.
Excellent test.
Write for samples.
THE COMMONWEALTH PRESS
Worcester, Mass.

EQUIPMENT WANTED ADVERTISING—PAGE 174

Really REBUILT FOOD EQUIPMENT

One of the finest machine shops in the country manned by expert mechanics and technicians guarantee that your machine will reach you ready for your production line. Good used equipment, reconditioned by a reliable house can be obtained at once, in most cases without priority, and having been tested under actual working conditions, can be relied on. Food will win the war and FMC can help you produce it.

30 New and Rebuilt Copper Jacketed Kettles from 30 gal. to 500 gal.

12 Copper Ring Coils; 3 and 4 turn; made of heavy 2" copper tubing

6 Chrome Steel 1200 gal. Vacuum Vessels; Jacketed and Agitated

1 Pfaudler 50 Gal. Glass Lined Jacketed and Agitated Kettle

8 Mass or Dough Mixers up to 4 BBL.; double arm gear driven

15 New and Used Dry Powder Mixers; from 200 lb. to 2000 lb.

1 Sterling Dicer; ½" dies; type EM heavy duty

4 Sterling Potato Peelers; No. 16 and No. 28

2 Buffalo No. 9 Kraut Cutters; 5 Simplex Cabbage Corers

1 Lewis Pineapple Slicer; 1 Pineapple Peeler; 1 Oppenheim Onion Grinder

1 Buffalo Bean Chopper; 5 Enterprise and Buffalo Meat & Coffee Grinders

6 Schutz-O'Neil Sugar Mills and Pulverizers

3 American Utensil and Langsenkamp Juice Extractors and Pulpers

3 Scott and Hoepner Weighers, Scales and Fillers; 1 Hoepner Bag Stitcher

7 Pressure Fillers; Kiefer, Haller, Fowler for Juices, Syrups, Vinegar, etc.

3 Merrill Soule Six Pocket Fillers

1 Anderson Barnsgrover 12 Valve Syruper and Filler

1 Ayers 10 Pocket Pea and Bean Filler with syruper

ONLY 22
STAINLESS STEEL JACKETED KETTLES
AA4 Priority-Required 80 gal. to 200 gal.

6 COPPER JACKETED VACUUM PANS
Up to 500 Gal.

2 MIKRO PULVERIZERS
No. 4-24" with motors

1 National Packaging Two Station Automatic
POWDER FILLER

1 Package Mach. Co.
CUBE WRAPPER

2 Filler Machine Co. 4 Piston Fillers; 1 Progressive 6 Spout Filler

1 Progressive Late Model 2 Spout Piston Filler; stainless construction

1 Ayers 12 Valve Stainless Filler, Tomato Juice into #211 cans

2 Standard Automatic 12 spout and 15 spout fully automatic Vacuum Fillers

6 Kiefer and U.S. Bottle and Jar Washers and Rinsers

2 Rotary Tomato Washers; 2 Scalders (one inclined and one straight)

15 National, World, Ermold, O. & J. Bottle and Jar Labelers

8 Standard Knapp and Burt Can Labelers; up to No. 10's

1 Standard Knapp No. 435 Shipping Case or Carton Sealer

1 Johnson Bread Wrapper; adjustable sizes

1 Reddington Wrapper for one pound Macaroni or Sphaghetti package

1 Pneumatic Scale 6 Head fully automatic Capper

3 Capem 4 Head fully automatic Screw Cappers

SPECIAL LOT OF APPLE EQUIPMENT including Cider Presses, Boutell and Coons Parers, Peelers, Slicers, Corers, Graders, Pomace Separators, Apple Conveyor, Dehydrators, etc.

Sanitary Pumps, Conveyor, Hoists, Elevators, Bucket Elevators, Trucks, Storage Tanks, Portable Agitators, General Factory Handling Equipment

The ABOVE IS ONLY A PARTIAL LIST OF FOOD EQUIPMENT. SEND US YOUR INQUIRY

FIRST MACHINERY CORP. 819-837 E. 9th ST., N. Y. C.

SPECIAL
Just Received

2—Pneumatic Scale 24 spout vacuum type filling machines.

1—Elgin 6 head vacuum type liquid filling machine directly connected with Elgin Screw Capper

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Pneumatic Scale Co. Top Sealer and Wax Liner.

48" Copper Vacuum Pan, jacketed, complete with condenser, vacuum pump, etc., also 20 to 300 gal. sizes.

Wolf Steam Dryers consisting of 6 steam jacketed tubes with spiral ribbon conveyors.

Werner & Pfleiderer, 2,500 gal., double arm jacketed **Storage and Mixing Tanks.**

U. S. Bottlers 10 spout Model C-10 **Filling Machine,** 4 to 16 oz. cap.

850 gal. capacity Steam Jacketed Single Action Vertical Mixing Tank.

Johnson 18" Hydraulic Filter Press equipped with steam jacketed plates.

Gruendler #2 Peerless Hammer Mill equipped with roller bearings for motor drive.

Johnson, Automatic Packaging Unit, for setting up, filling and closing cartons.

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Including cartoning units, filling and wrapping machines—all types, makes and sizes in stock

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UNION STANDARD EQUIPMENT CO.

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1—Pneumatic Weigher & Packer, fills & weighs 8 to 10—50# bags per minute.

1—W & P Lab. Mixer, 2-qts., Speed Reducer & Motor.
1—W & P Jacketed Bronze Mixer, 30-gals.
1—W & P Jacketed Mixer, 30-gals.
5—Broughton Mixers, ½ ton; 1 ton.
3—Pony Mixers, 8-gals. to 20-gals.
3—Degreasing Ovens, 7'6"x6'x15'; 9'x8'x15'.
1—Black & Clawson Two-Drum Dryer, 28"x60".
1—Devine Rotary Vacuum Dryer, 3'x12'.
2—Ruggles-Coles Rotary Direct Heat Dryers, 54"x20'.
10—Sharples Super Pressurite Centrifuges.
1—Zahn & Nagel Kieselguhr Filter, 24", 14 leaves.
1—Sweetland #7 Filter Press.
2—FEINC Wooden Continuous Filters, 8'8"x6'; 4'x10'4".
1—Stokes Evaporator, 52"x9'.
2—Kilby Double-Effect Evaporators, 3" brass tubes.
1—Single-Effect Evaporator, 2" copper tubes.
2—Griscom-Russell Sectional Condensers, brass tubes.
5—Steel Heat Exchangers, 44"x7½', 1" brass tubes.
1—Copper Jacketed Kettle, 3750-gals.
1—Aluminum Tank, 4000-gals.
1—Steel Acid Brick-Lined Tank, with Agitator, 2650-gals.
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1—Premier Liquid-Type Colloid Mill.
1—Stainless Steel Washer & Extractor, 36"x18" deep.

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Triangle Model "U" Bag Filler
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Schutz O'Neill Dustless Sugar Pulverizer No. 3, No. 0 and 16" Limited.
24" Pebble Mill, belt drive.
1 ton York, 1 ton Lipman 3 ton Frick, 5 ton Jurick and 7½ ton Lipman Self-contained Refrigeration Units.
Steam Jacketed Copper Kettles, 15 gallon to 350 gallon capacity.
Dean Glucose Pump Steam Driven.
Tabor 3" Glucose Pump, motor driven.
Read 80 qt., Hobart 80 qt., Century 30 qt., and Read 12 qt. Vertical Mixers.

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FOR SALE

2—Triple effect Evaporators.
1—Berlin-Chapman 15-pkt. Syruper-Filler
3—Lard Rolls, 3x6' and 18x48"
2—Automatic Screw Capping Machines
5—Attrition Mills—18, 22 and 30".
1—2-roll Raymond Roller Mill.
2—Karl Kiefer Visco Fillers.
1—Urie Universal Filler.
6—#300 and #600 DeLaval Clarifiers.
1—World automatic rotary Labeler.
2—Rotary Bottle Rinsing Machines.
2—M&S Universal Filling Machines.
1—#6 style B Peerless rotary Exhauster.
6—20 gal. Jack. Copper Tilting Kettles.
Dough and Powder Mixers, Bottle and Can Fillers, Filters, Filter Presses, Mills, Dryers, Pumps, Boilers.

Send us your inquiries, also your list of surplus equipment, which we purchase for cash.

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FOR SALE

1—2 Spout Stainless Steel **Piston Filler**
5—**Pneumatic Scale** Automatic Straight Line Labelers
4—**Simplex** Bronze End **Steam Pumps,** 5x5x8, 6x5x10, 4x4½x6 and 3x3½x4
40—100 Gal. Galvanized **Spice Hoppers,** on Casters, with Discharge Valves.
1—**Standard Knapp** Automatic **Top Case Sealer** with 12' Gluer.
1—39" Dia. Copper Jacketed **Vacuum Pan.**
1—**Richardson** Automatic **Grain Scale.**
1—**Gruendler** No. 16 **Hammer Mill.**
3—Cast Iron **Steam Pumps** 12x12x14, 9x8½x10 and 6x4x6.
7—Bronze and Cast Iron **Centrifugal Pumps.**
4—Kiefer and U. S. **Rotary Rissers.**
236'—1½" **White Beer Hose** with Fittings.
1—200 Gal. Open Top Jacketed Glass-Lined **Mixing Kettle.**
1—Baer Automatic Keg and **Barrel Washer.**
1—**Complete Plant** for Manufacturing Butyl Alcohol, Ready to Operate.
40—Horizontal Steel **Storage Tanks,** 4650 to 9300 Gals. Capacity with Supports, etc.
6—Copper and Cast Iron **Rectifying Columns,** 14"—72" Diams., 10—44 Plates.

Many other items for Packaging and Processing.

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Complete equipment and formula for manufacturing "Corn Chips". Includes Wet Grind Mill, Extrusion Press, Frying Tank and Centrifuge.

Price $495.00, F. O. B. Pittsburgh.

SHUMANN EQUIPMENT COMPANY
137 Bausman Street Pittsburgh, (10) Pa.

WANTED

WANTED

2—Tablet Machines; 3—Filters.

2—Dry Powder Mixers, with or without Sifters.

2—Rotex Screens; 1—Packaging Machine; 1—Glass Lined Kettle; Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan.

W-132, Food Industries, 330 W. 42nd St., N. Y. C.

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from the West Coast

A-B Cooker 1360 cans 1-T and #2
A-B Cooker, 1360 cans, with cooler for #2-2½. 2 avail.
Dundon Retort, 4' x 18'.
Batch Peelers, 45 Lbs and 75 Lbs
Devine Steam Tube Dryer, 2' by 16'
U.S. Single Piston Filling Machine
Kettles—all sizes up to 500 gal.
Knapp Labelers Adj. to #2½ (two)
Knapp Can Caser motor driven
Charlotte Colloid Mill, St.. Steel.

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SALE!
Guaranteed Equipment

¼ HP Bronze Centrifugal Pump.
3" Bronze Centrifugal Pump, 300 GPM.
150 Gal. Copper Kettle, tested.
1" Ideal Stencil Cutter.
2000# Lift Truck.
Burt Labeler, #1 to 2½ cans.
54" x 14' Retort, cars & trays.
44" x 8' Retort & cars.
24" x 52" Vertical Retort.
1196 can #2/2½ Cooker & Cooler.
292 can #1/2½ Exhaust Box.
8 spout #2/2½ Price Syruper.
#2 Anderson ⅜" Dicer.
Ayers #1/2½ Pea & Bean Filler & Briner.
Ayers #2½ Tomato Filler.
Elgin Stainless Steel Vacuum Filler, 6 spout automatic (new).
5' x 6' Buffalo Drum Dryer.
Roller Conveyor Spiral Chute. 25" between guide rails.
Jumbo Model E Crowner.
#5 Sweetland Filter, bronze.

FS-144, Food Industries
330 West 42nd St., New York City

WANTED

Two 100 Gallon and One 150 Gallon Steam Jacketed Kettles also 250 Gallon Glass Lined Mixing Tank with Motor Attached.

Advise make, condition and best cash price

SEMINOLE FRUIT & PRESERVING CO. INC.
P. O. Box 1 **Little River (Miami), Fla.**

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New or used Automatic or semi-Automatic Cottage Cheese or Sour Cream filling machine.

W-142, Food Industries
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1—Buflovak 5′ x 6′ Atmospheric Drum
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3—Atmospheric Double Drum, 3′ x 8′, 4′ x 9′
7—Rotary 3′ x 30′, 4′ x 30′, 5′ x 35′, 6′ x 65′
1—Rotary Indirect 6′ x 45′, monel lined
2—Hersey Rotary Indirect 5′ x 25′, 6′ x 25′

KETTLES—PANS—EVAPORATORS

1—Steel Evaporator, 11′6″ dia., 1560—2″ x 4′ steel tubes
3—Swenson Triple Effect Evaporators
1—Buflovak No. 55 Triple Effect Evaporator
1—3′ Stokes Copper Vacuum Pan, agitated
1—Buflovak Impregnating Kettle, 42″ x 60″
3—Copper Vacuum Pans, 2′6″ 7′ dias.
1—Badger 1000 gal. Copper Still
25—Copper Jcktd. Kettles, 10 to 300 gals.
9—Steel Jcktd. Kettles, 50 to 2000 gals., agitated

CENTRIFUGALS

1—Weston 40″ Suspended, with 40 HP AC motor
3—Tolhurst 40″ Suspended, with 10 HP AC motors
1—Tolhurst 40″, with 7½ HP motor
7—Tolhurst 32″, 40″, 48″, 60″, self-balancing
6—Sharples No. 6
1—Sharples Lab. Centrifuge
4—De Laval Nos. 200, 500, 600, 700

MIXERS

1—W. & P. 50 gal.
1—Day No. 30 Imperial Jcktd., 75 gal.
5—Change Can, 8 to 40 gal.
1—Day Universal, Jcktd., 265 gals.
20—Day Powder Mixers, 25 to 2000 lbs.
5—Hobart and Century Vertical Cream Mixers
6—Ross, Day, Read, Lab. to 350 gal.

FILTERS

1—Oliver 36″ x 36″, cast iron, 41 chambers
1—No. 5 Sweetland, 30 copper leaves, 2″ centers
1—No. 7 Sweetland, 21 leaves, 3½″ centers
3—12″ Ertel Disc Filters
1—Sperry 36″ x 36″, cast iron, 41 chambers
10—Shriver Skeletons, 12″ to 36″ square
8—Kilby 30″ x 30″, cast iron, 38 chambers
5—Oliver Rotary, 4′ x 6′ to 12′ x 12′

PULVERIZERS—GRINDERS

4—Raymond No. 0000, 11, 1
7—Hammer Mills, Williams, JayBee, Jeffrey, 5 to 100 HP
5—Mead Mills, Nos. 1, 2, 3
1—Schutz O'Neill No. 3 Sugar Mill
15—Pebble Mills, Lab., to 300 gal.
6—Roller Mills, Lab., to 16″ x 40″
6—U. S., Premier Colloid Mills, ½ to 100 HP
3—Schutz O'Neill Mills, 20″ to 28″

TANKS

3—Pfaudler Glass Lined, 1500 gal.
5—Sectional Brewery, 8′ to 9′ dia.
10—Glass Lined, 50 to 500 gals.
15—Steel Storage, 3500 to 15,000 gal.
2—20′-x 20′ Open Top Steel

FILLING & PACKAGING EQUIPMENT

3—Stokes, Stokes & Smith Powder Fillers
2—Kiefer Visco Fillers
4—Knapp, Burt Can Labelers
10—Ermold, World, National Semi-Automatic Labelers
2—World, International Automatic Labelers
1—Kiefer 8 spout Vacuum Bottle Filler
1—Kiefer 18 spout Rotary Bottle Fillers
5—Stokes, Colton Jar Fillers
1—Pneumatic Scale Packaging unit

MISCELLANEOUS

10—Vacuum Pumps, Devine, Buffalo, Beach Russ
1—Redler Tubular Conveyor
20—Rotary and Centrifugal Pumps, 1″ to 6″
5—Rotex, Tyler Screens, 20″ x 48″, to 4′ x 5′
4—Tablet Machines, ¼″ to 1½″ dies.
Bucket Elevators, Screw Conveyors, etc.

YOUR INQUIRIES SOLICITED.

SEND US YOUR LISTINGS.

BRILL Equipment Co.
183 VARICK STREET NEW YORK

FOR SALE

50 gal. Alum., direct fired **Kettle**, agit.
300 gal. **Nickel Tanks**, 36″x60″x36″, insul.
200 gal. **Pfaudler Tank**, jkt., agit., 38x42.
300 gal. **Pfaudler Tanks**, horiz., 42x48, insul.
2000 gal. **Pfaudler Tank**, horiz., agit., 84x84.
70 gal. **Copper Still** with coil, 26″x36″.
25 gal. **Copper Kettle**, jkt., agit., 22x18.
250 gal. **Steel Kettle**, jkt., agit., 36x60.
J. H. Day Post Mixers, S.S. paddles.
1½ bbl. **Dough Mixer**, 3 H.P.
80 qt. **Hobart Mixer**, 2 H.P.
1″ **Ingersoll-Rand Centrif. Pump**, 2 H.P.
2″ **Buffalo Centrif. Pump**, 7½ H.P.
2″ **Westco Pump**, 2 H.P.
60 to 400 gal. **Homogenizers or Viscolizers.**

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GUARANTEED EQUIPMENT!

- AGITATORS
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- KETTLES, JACKETED
- FILLERS & LABELLERS
- RETORTS & STERILIZERS
- GLASS LINED, STAINLESS STEEL & MONEL STORAGE TANKS

We have no connection with any other company!

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1—Late Model—
5 Tube "Doig" #17 Nailing Machine
Good as New

KURTZ BROTHERS
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Davidson Wet Vacuum Pump 3½ x 4 x 4.
Several used Copper Steam Jacketed Kettles.
3 HP Elec. Motor D.C. 575 rpm perfect.
One 10 HP Kane gas fired steam boiler almost new.

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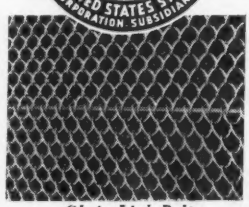
Are you winning the "war of movement" in your plant?

THE steady flow of goods to the war fronts begins in America's busy plants. One way to prevent production tie-ups is to transport goods within the plant on reliable, continuous conveyor belts. U·S·S Cyclone Metal Conveyor Belts have the strength to stand up under severe punishment. They are unharmed by water and steam. They are flexible, porous, heat-resistant and sanitary.

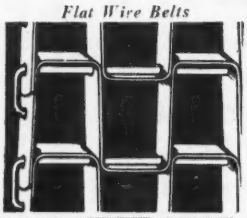
Available in Flat Wire and Chain Link types—in a variety of weights, widths and sizes of mesh. Wide selection of types, including belts specially designed for food dehydration processes. Write us for further information and prices.

USS CYCLONE Red Tag METAL CONVEYOR BELTS — CYCLONE FENCE DIVISION American Steel & Wire Company — UNITED STATES STEEL CORPORATION SUBSIDIARY



Chain Link Belts

Flat Wire Belts



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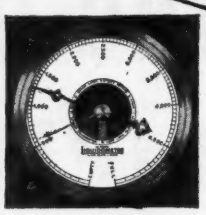
My Business Maintains High Accuracy Standards, That's Why In Measuring Valuable Stored Liquids, We Rely On ...

LIQUIDOMETER *Tank Gauges*

"THEY'RE ALWAYS DEPENDABLE"



100% automatic—these tank gauges insure accurate, trouble-free readings whenever required. No pumps, valves, or auxiliary units required to read them. Models available so that readings can be taken remotely from or directly at the tank. Remote reading types utilize balanced hydraulic transmission system which completely compensates for temperature variations on communicating tubing. Accuracy unaffected by specific gravity of tank liquid.

Approved for gauging hazardous liquids by Underwriters' Laboratories and other similar groups. Models available to automatically control pumps, motors, signals or other devices for maintaining minimum or maximum liquid levels.

Write for complete details.

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38-14 SKILLMAN AVE., LONG ISLAND CITY, N.Y.

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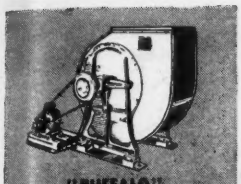

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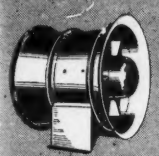

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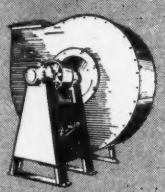

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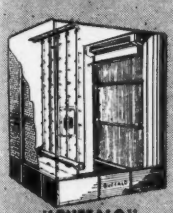

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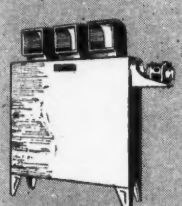

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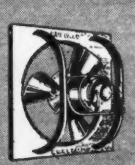

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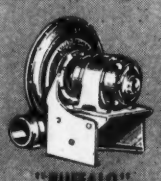

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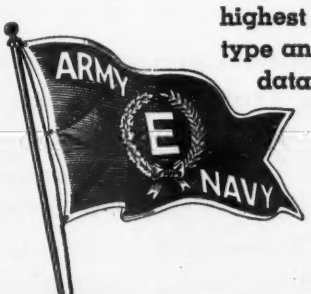

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How to Assure Uniform Quality in

DEHYDRATION

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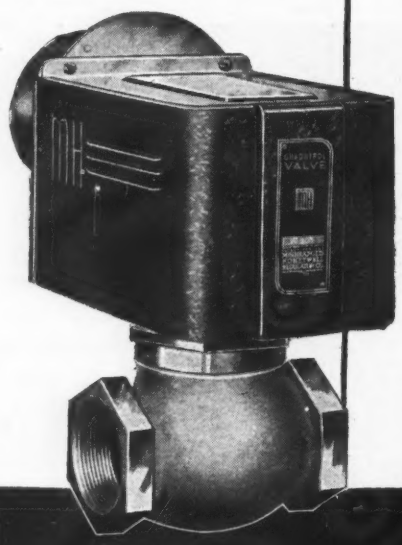
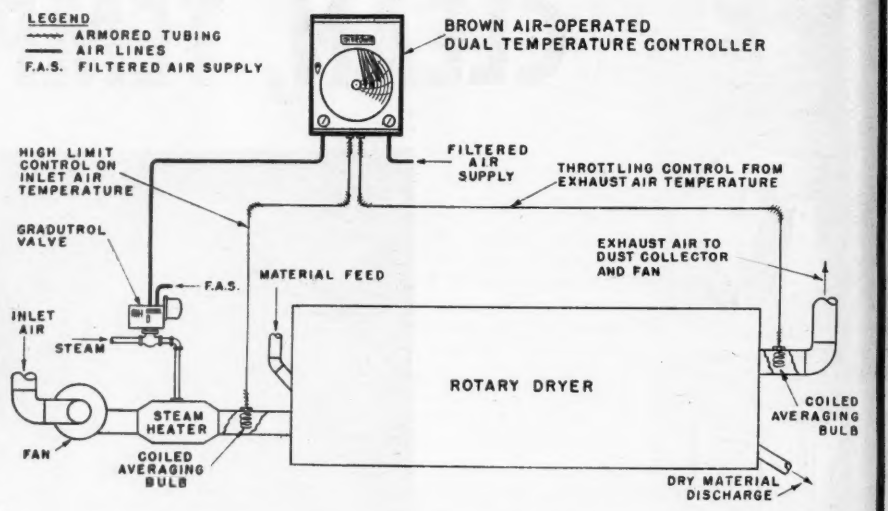
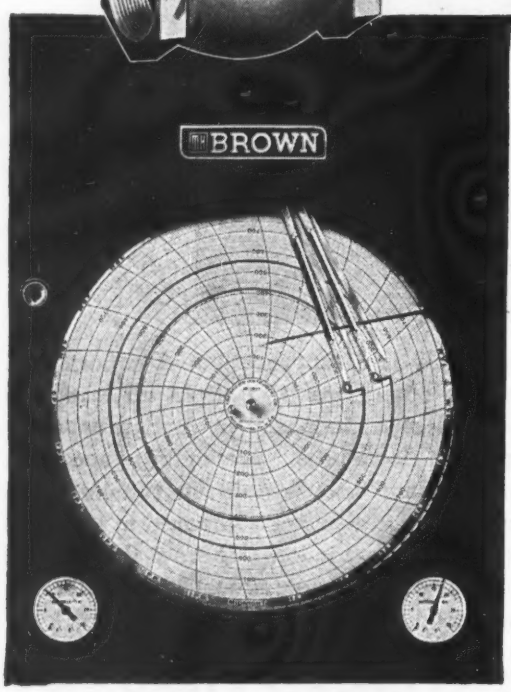




BROWN TEMPERATURE CONTROL SYSTEM FOR ROTARY DRYERS.



BROWN 10% THROTTLOR DUAL AIR-OPERATED TEMPERATURE CONTROLLER. *For details write for catalog 8903.*

M.H./Brown temperature control system (shown above) for rotary dryers control the exhaust air temperature which takes into account the actual conditions of the dryer. If inlet air approaches the maximum safe temperature, a high limit control shuts off the heat preventing the product from being damaged by excess heat.

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Lithographed Cans

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